



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, MD 20910

MEMORANDUM FOR: David Bernhart,
Assistant Regional Administrator for Protected Resources
NOAA Fisheries Service, Southeast Regional Office

FROM: Jamie Schubert, Marine Habitat Resource Specialist
NOAA Restoration Center

DATE: July 7, 2015

SUBJECT: DWH-ERP-Request for section 7 Endangered Species Act
Informal Consultation for *Deepwater Horizon* Oil Spill Phase IV
Early Restoration Plan project *Texas Rookery Islands*

The National Oceanic and Atmospheric Administration (NOAA) Restoration Center requests informal consultation with your office, under section 7 of the Endangered Species Act (ESA), for impacts from the Texas Rookery Islands Project. This project has multiple components located on the following islands : 1) Rollover Bay, 2) Dickinson Bay II, 3) Smith Point and 4) Dressing Point. This project has the potential to affect the following federally listed species administered by NOAA Fisheries:

Sea Turtles (Green-T, Hawksbill-E, Leatherback-E, Loggerhead-T, Kemp's ridley-E)

The NOAA Restoration Center, a Lead Federal Agency, is requesting consultation on behalf of the Natural Resource Trustees for *Deepwater Horizon* Oil Spill. Please find Biological Evaluation forms for this Phase IV Early Restoration Project (multiple locations) included with this memo. It is our expectation that the proposed projects will have a significant net benefit to the Gulf of Mexico ecosystem.



Endangered Species Act Biological Evaluation Form ***Deepwater Horizon Oil Spill Restoration***

Fish and Wildlife Service & National Marine Fisheries Service

Texas Rookery Islands Project (Rollover Bay Island)

Section A. Project Identification

Lead Agency Agency Contact Person

U.S. Fish and Wildlife Service/National Marine Fisheries Service

Agency Contact Person

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I. Applicant Agency or Business Name

Texas Parks and Wildlife Department (TPWD)

II. Applicant Contact Person

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IV. Project Name and ID# (Official name of project and ID number assigned by action agency)

Texas Rookery Island Project – (Rollover Bay Island)

V. Project Type

Other

VI. NMFS Office (Choose appropriate office based on project location)

NMFS Southeast Regional Office

- VII. FWS Office (Choose appropriate office based on project location)
Texas Coastal Ecological Services Field Office, Houston, TX

Section B.

- I. Project Location
Rollover Bay Island is situated within the Galveston Bay system, Galveston County, Texas. Specifically it is located in Rollover Bay which lies in East (Galveston) Bay. Rollover Bay Island lies approximately 1.0 miles from the community of Gilchrist on Bolivar Peninsula and approximately 7 miles southwest of the community of High Island. Bolivar Peninsula is a barrier island that separates Galveston Bay from the Gulf of Mexico.
- II. State & County/Parish of Project Site
Galveston County, Texas
- III. Latitude & Longitude for Project Site (Decimal degrees and datum [e.g., 27.71622°N, 80.25174°W NAD83] [online conversion: <http://transition.fcc.gov/mb/audio/bickel/DDDMSS-decimal.html>])
29.521548° N, 94.505693° W; NAD83
- IV. Township, range and section of the project area
Texas does not use the public land survey system.

Texas Rookery Islands Project (Rollover Bay Island)

Section C. Description of Action Area

Rollover Bay Island lies on the upper Texas coast within Galveston Bay. The island is located in Rollover Bay, a sub-bay of East (Galveston) Bay near Rollover Pass, adjacent to the Gulf Intracoastal Waterway (GIWW) (Figures 1-4). Rollover Pass is a tidal connection from East Bay to the Gulf of Mexico. The natural pass was deepened and enlarged to enhance migration of fisheries resources between the bay and the Gulf. Several dredged material placement islands (approximately 11 islands) were created in Rollover Bay during excavation and maintenance of the GIWW. Since the creation of the GIWW, only 5 of the original 11 islands remain intact. the preliminary site chosen for the restoration is associated with one of these five remaining islands.

Erosion and subsidence have decreased the size of Rollover Bay Island from greater than 5 acres in 1982 to approximately 1 acre. It has eroded substantially in recent years and now minimally supports colonial nesting waterbirds. The island is managed by Audubon Texas under a lease agreement with the Texas General Land Office. The project proposes to enlarge the island using earthen fill, add or enhance armored protective features such as breakwaters or shoreline armoring, and vegetate the island with desirable scrub-shrub plants (Figure 4). The purpose of these actions is to provide habitat that will support colonial nesting waterbirds.

The majority of construction activities would take place on the island. Sources of fill material would be obtained from offsite locations which may include a direct dredge borrow source, the Gulf Intracoastal Waterway (GIWW), and/or a USACE placement area (Figures 3 and 5). Temporary access channels may be constructed in order to access and transport the fill material. Indirect and temporary effects would take place with boat ramps, navigation channels, staging areas, and potentially with local recreational users.

#1 Attach a separate map delineating where the action will occur.

See attached Figures.

#2 Describe ALL areas that may be affected directly or indirectly by the Federal Action and not merely the immediate project site involved in the action, or just where species or critical habitat may be present. Provide a description of the existing environmental conditions and characteristics (e.g., topography, vegetation type, soil type, substrate type, water quality, water depth, tidal/riverine/estuarine, hydrology and drainage patterns, current flow and direction), and land uses (e.g., public, residential, commercial, industrial, agricultural).

The majority of the Action Area is identified in Figure 4. The GIWW is located adjacent to the island and is between the island and Bolivar Peninsula.

Several dredged material placement islands (approximately 11 islands) were created in Rollover Bay during excavation and maintenance of the GIWW. The preliminary site chosen for the restoration is associated with one of the five remaining islands.

Figures 4 and 5 shows the location of the island, the preliminary restoration design, potential borrow source area, and navigation channels.

The community of Gilchrist is located on Bolivar Peninsula, contains homes and structures, commercial facilities, recreational vehicle parks, a local recreational fishing and birding area, Rollover Pass. This community may be impacted by noise, additional use of the boat docks, and additional personnel passing through the area.

See below for detailed descriptions of the action area.

Existing Environmental Conditions and Characteristics

Substrate type, Topography, and Soils

Several dredged material placement islands (approximately 11 islands) were created in Rollover Bay during excavation and maintenance of the GIWW. The preliminary site chosen for the restoration is associated with one of the five remaining islands. The material excavated was composed primarily of clays and silts with some sand containing fossil shell and shell fragments. The Galveston County Soil Survey identifies the island soils as Ijam Soil Series. These soils form in materials dredged from bays and

waterways. The island is near the GIWW which has depth of about 10 feet. The surrounding area is around 4 feet deep.

Rollover Bay Island is comprised of intertidal and supratidal habitat. Erosive forces have winnowed the lighter sediment and concentrated fossil mollusk shell and shell fragments leaving a surface layer of hard shell substrate. This shell material is not part of accreting reefs dominated by living eastern oysters and does not have commercial fisheries value; however, the shell reef is an important ecological habitat in Galveston Bay. The submerged bay bottom surrounding the island is primarily composed of clays with some silt, scattered fossil shell and hard bottom substrate (Figure 8).

Material from the GIWW that is comprised of quality sands is used for beach re-nourishment south of Rollover Pass. Other sediments dredged from the GIWW that are not beach quality sands are relocated into placement areas along the GIWW.

The project may use sediments from one of several sources areas. These include a suitable site within the direct dredge borrow source area (Figure 4), material mined from USACE placement areas (Figure 5), beneficial use of dredged material from a reach of the GIWW, or earthen fill associated with an upland borrow site. The direct dredge borrow source area is comprised of a mix of sand, silt and clay (White et al. 1985). The grain size composition of GIWW sediments vary but would include substantially more clay and silts.

Existing Vegetation Type

The island was created by the deposition of dredged materials and is experiencing rapid erosional losses. In the areas which vegetation exists, it is primarily comprised of common reed (*Phragmites australis*), high tide bush (*Iva frutescens*), sea oxide daisy (*Borrchia frutescens*) and sea purslane (*Sesuvium sp.*).

The island is currently classified under the Cowardin classification system as Estuarine Intertidal Wetland.

Water Quality, Water Depth, Tidal/Riverine/Estuarine, Hydrology and Drainage Patterns, Current Flow and Direction

The hydrology of the surrounding areas of this island is affected by tidal actions between East Bay and the Gulf of Mexico through Rollover Pass and currents associated with GIWW traffic. Tidal currents are fairly strong as water moves between the neighboring waterbodies. Based on evaluation of on-site conditions and review of aerial imagery, most of the chronic erosion appears to be the result of northerly winds associated with the passage of seasonal cold fronts and the long fetch from East Bay. Tropical storm events have adversely affected the island in the past, resulting in overwash events during nesting (Hurricane Alex in July 2010) or erosion (Hurricane Ike in September 2008 and winter storm events). The engineering design phase of the island would evaluate tidal actions in the area to ensure that forces associated with tropical storms, the East Bay fetch, GIWW traffic, and Rollover Pass are considered, as well as methods to protect to the island from land loss associated with predicted relative sea level rise.

The depths surrounding the island are relatively shallow ranging to a depth of approximately 5 feet in the surrounding area and up to 10 feet in the nearby GIWW. Tidal currents are fairly strong as water moves between the neighboring waterbodies (GIWW, Gulf of Mexico, Rollover Pass, and East Bay; Figure 3). Wind speed and direction within the Galveston Bay System plays an important role in affecting tide elevation. It can dampen or enhance the height of waves as well as their potential energy.

According to the water quality index, Galveston Bay received a poor rating. Galveston Bay is rated fair for dissolved inorganic nitrogen concentrations and rated poor for dissolved inorganic phosphorus concentrations. Thirteen percent of the estuarine area was rated poor for dissolved inorganic nitrogen concentrations, whereas 68% of the estuarine area was rated poor for dissolved inorganic phosphorus concentrations. Expectations for water clarity are similar to those for normally turbid estuaries, with water clarity rated poor at a sampling site if light penetration at 1 meter was less than 10% of surface illumination. Dissolved oxygen conditions in Galveston Bay are rated good (U.S. EPA 2007).

Due to the accumulation of dioxins and PCBs in catfish, the project area has consumption advisory (#50) for all species of catfish (Accessed 9 March 2015: <http://www.dsht.state.tx.us/seafood/Survey.shtm#advisory>).

Land Uses

Rollover Bay Island is managed by Audubon Texas through a lease with Texas General Land Office. Audubon Texas manages the island for nesting colonial waterbirds. Activities conducted by Audubon Texas include monitoring, predator control, and educational signs to reduce disturbance. The project area includes submerged bay bottom that is managed by the state of Texas. Any additional lease(s) for managing the submerged bay bottom and the construction activities would be obtained prior to implementing the proposed restoration.

The GIWW is adjacent to the project area and is used by marine vessels for transportation. The navigation channel will be utilized to transport supplies to the project area.

Commercial and recreational fishing, boating, and potentially wildlife viewing does occur in the open water areas. Wade fishing generally occurs south of the GIWW in Rollover Bay and should not be affected by the project. Appropriate signage and buoys markers at the site and at boat ramps will be displayed. Postings in local media will also take place to ensure that efforts are made to inform recreational users.

There are no pipelines, oyster leases, or documented oyster reefs nearby.

#3 If habitat for species is present in the action area, provide a general description of the current state of the habitat.

While nesting activity of colonial waterbirds has declined in recent years, birds continue to use Rollover Bay Island for staging, loafing, roosting, and possible nesting sites. The island supports limited colonial

waterbird nesting and little species diversity due to its diminishing size and habitat loss. Limited to no nesting took place during 2013 and 2014 on what remains of the island (Hackney and Woodrow, pers. comm. 2014). Table 1 lists the colonial waterbird species that historically used Rollover Bay Island for nesting purposes. Non-colonial waterbird species that may nest on the island include the eastern willet (*Catoptrophorus semipalmatus*) and American oystercatcher (*Haematopus palliatus*). Water dependent birds may use the open bay to forage and roost. These would include loons, bay ducks, gulls and terns, and pelicans.

Table 1. Colonial waterbird species recorded nesting at Rollover Bay Island Complex.

Common Name	Scientific Name
Brown Pelican	<i>Pelicanus occidentalis</i>
Neotropic Cormorant	<i>Phalacrocorax brasilianus</i>
Great Egret	<i>Ardea alba</i>
Great Blue Heron	<i>Ardea herodias</i>
Snowy Egret	<i>Egretta thula</i>
Tricolored Heron	<i>Egretta tricolor</i>
Reddish Egret	<i>Egretta rufescens</i>
Cattle Egret	<i>Bubulcus ibis</i>
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>
Roseate Spoonbill	<i>Platalea ajaja</i>
White Ibis	<i>Eudocimus albus</i>
Laughing Gull	<i>Leucophaeus atricilla</i>
Forster's Tern	<i>Sterna forsteri</i>
Black Skimmer	<i>Rynchops niger</i>

Non-avian terrestrial wildlife has not been observed at Rollover Bay Island. Texas diamondback terrapins (*Malaclemys terrapin*) may use the existing islands and surrounding waters.

Hard shell substrate, a valued benthic substrate in Galveston Bay, is present in the island area. Some of this hard shell substrate may require restoration to mitigate for lost hard substrate due to placement of fill material for the island restoration. Dominant aquatic species that could be found in the project area include fish species (sand seatrout, spotted or speckled seatrout, red drum, tonguefish, flounders, Atlantic bumper, and porgys) and benthic organisms (bivalves, gastropods and other mollusks, amphipods, annelids, and brown and white shrimp). Seagrasses are not expected and were not identified as being present using the TPWD seagrass viewer: <http://tpwd.texas.gov/gis/seagrass/>.

4 Identify any management or other activities already occurring in the area.

The GIWW, which is adjacent to the project area, is used for marine transportation. The USACE regularly dredges the GIWW in order to keep the waterway open for marine traffic. Sediments are placed in placement areas along the GIWW or deposited as beach nourishment as appropriate. Due to

the cut at Rollover Pass (Figure 3), sands move into the GIWW where they are regularly dredged and used for beach nourishment in the surrounding area.

Currently, Audubon Texas manages the island for nesting colonial waterbirds. Activities include monitoring, predator control, and educational signs to reduce disturbance. Fisherman and boaters may use the nearby open water areas for recreational or commercial purposes.

#5 Detailed map of the area of potential effect for ground disturbing activities.

The potential area of impact from the construction activities is shown in Figures 4 and 5. Earthen fill material will be placed on submerged lands and on top of the existing island to raise elevations. Once the earthen fill has dewatered and sediments have settled, the higher elevation portions of the restored island would be planted (about 4 acres) with shrub-scrub vegetation. The final elevation of the improved island will be such that it will support ground nesting species of colonial waterbirds. The restored island would be protected by armored levees or breakwaters along its vulnerable sides. Approximately 4,500 feet of armored levees, or other structure would be constructed to contain fill material and protect the island from erosion. The target elevation for the restored island would place the crown at least 4 feet above mean tide level post-settlement sloping to existing natural grades. The island would be sloped into the tidal zones at both ends of the island to provide access for colonial waterbirds.

A small area has also been identified for mitigation to hard bottom substrate if it is needed. Restoration and protection of Rollover Bay Island requires the placement of material on the submerged bay bottom, which may impact hard shell substrate, a valued benthic substrate in Galveston Bay. Any impacts incurred after avoidance and minimization measures are taken would be fully mitigated by restoring an equal or greater amount of hard substrate.

A temporary access channel to the island may be required from the GIWW to the island site (about 600 feet) or from the borrow source area to the island (about 2,000 feet). This channel would be no more than 50 feet wide and no more than 5 feet deep and would be backfilled at the end of construction activities.

Specific sources of sediment/fill material have not been identified for this project. However, the potential sources of material would be from a direct dredge borrow source area (Figure 4), the GIWW, (Figure5), a USACE GIWW placement area (Figure 5), or an unidentified upland borrow location..

Section a. Waterbody (If applicable. Name the body of water, including wetlands (freshwater or estuarine), on which the project is located. If the location is in a river or estuary, please approximate the navigable distance from the project location to the marine environment.)

Rollover Bay Island is located north of the Gulf Intracoastal Waterway (GIWW) within Rollover Bay, a sub-bay of East (Galveston) Bay near Rollover Pass. Rollover Bay Island is currently classified under the Cowardin classification system as Estuarine Intertidal Reef and Emergent or Scrub-Shrub wetland. As

the island eroded the associated shell from the dredging operation remained and provides Intertidal and Subtidal Reef substrate habitat.

Section b. Existing Structures (If applicable. Describe the current and historical structures found in the project area (e.g., buildings, parking lots, docks, seawalls, groynes, jetties, marina). If known, please provide the years of construction.

There are no existing structures within the project site.

Section c. Seagrasses & Other Marine Vegetation

(If applicable. Describe seagrasses found in project area. If a benthic survey was done, provide the date it was completed and a copy of the report. Estimate the species area of coverage and density. Attach a separate map showing the location of the seagrasses in the project area.)

There is no known submerged vegetation present at the site. The TPWD seagrass viewer does not show any seagrasses in the project area (<http://tpwd.texas.gov/gis/seagrass/>).

Section d. (If applicable. Describe the mangroves found in project area. Indicate the species found (red, black, white), the species area of coverage in square footage and linear footage along project shoreline. Attach a separate map showing the location of the mangroves in the project area.)

There are no mangroves present on the island.

Section e. Corals

(If applicable. Describe the corals found in project area. If a benthic survey was done, provide the date it was completed and a copy of the report. Estimate the species area of coverage and density. Attach a separate map showing the location of the corals in the project area.)

There are no corals in the project area. Appropriate habitat does not exist.

Section f. Uplands (If applicable. Describe the current terrestrial habitat in which the project is located (e.g. pasture, forest, meadows, beach and dune habitats, etc.).

Several dredged material placement islands (approximately 11 islands) were created in Rollover Bay during excavation and maintenance of the GIWW. The preliminary site chosen for the restoration is associated with one of the five remaining islands. The material excavated was composed primarily of clays and silts with some sand containing fossil shell and shell fragments. The Galveston County Soil Survey identifies the island soils as Ijam Soil Series. These soils form in materials dredged from bays and waterways.

The island was created by the deposition of dredged materials and is experiencing rapid erosional losses. Rollover Bay Island is comprised of intertidal and supratidal habitat. Erosive forces have winnowed the lighter sediment and concentrated fossil mollusk shell and shell fragments leaving a surface layer of hard shell substrate. This shell material is not part of accreting reefs dominated by living eastern oysters and

does not have commercial fisheries value; however, the shell reef is an important ecological habitat in Galveston Bay. The shell is continually moved by wave energy which inhibits the accumulation of soil or fine shell material and therefore limits the extent of vegetation establishment. In the areas which vegetation exists, it is primarily comprised of common reed (*Phragmites australis*), high tide bush (*Iva frutescens*), sea oxide daisy (*Borrchia frutescens*) and sea purslane (*Sesuvium sp.*).

The island is currently classified under the Cowardin classification system as Estuarine Intertidal Wetland.

Material may be mined from an existing GIWW placement area (PAs) shown in Figure 5. Habitat associated with the PAs varies depending on the elapsed time since it was last used. Vegetation ranges from scrub-shrub vegetation with older sites to wet recently placed material. Given that any site used would require excavation, there would be impacts to the habitat within the affected PA. The site chosen would involve several factors such as distance, material, and be congruent with the existing management practices of the GIWW and would include coordination with USACE and Texas Department of Transportation (TXDOT).

If a remote off-site borrow source is chosen as for the fill material it may be an upland area. All potential upland sites will be characterized and reviewed for environmental constraints including contaminants, habitat value, presence of protected and at-risk species, and cultural resources. Any areas with critical habitat will be avoided and the activities associated with the use of an upland borrow site would not adversely affect listed species. To the maximum extent practicable, locations with at-risk species will be avoided as well.

Section D.

Part 1.

Construction Schedule (What is the anticipated schedule for major phases of work? Include duration of in-water work.)

Activities associated with engineering and design may take several months to accomplish with an estimated timeframe of 18 months. Dredging activities may be conducted both day and night. To prevent disturbance to nearby residential communities, construction activities that produce significant noise or require precision, such as moving or placing rock would be limited to daylight hours. Construction noise would be temporary and the construction period is not anticipated to last more than 12 months. If it appears that birds will nest on Rollover Bay Island, construction would avoid the nesting season, which is usually February 1 through August 15. Activities associated with construction, which includes "in water work" are not expected to take longer than 12 months. The timing of contracting awards and weather conditions could impact the construction schedule. However, some field activities that pose minimal disturbance may be acceptable to occur while birds are nesting. Any such activities potentially affecting migratory birds and ESA protected species would be coordinated with the

appropriate state and federal agency biologists and with non-governmental organization (NGO) partners prior to initiation of the field work.

Part 2.

#1 What is the purpose and need of the proposed action?

The action falls within the scope of the programmatic purpose and need for early restoration Deepwater Horizon Oil Spill as described in the Programmatic and Phase III Early Restoration Plan and Early Restoration Programmatic Environmental Impact Statement because it would accelerate meaningful restoration of injured natural resources and their services resulting from the Spill. This project's purpose is to begin to restore and protect birds injured as a result of the Spill. The project is needed to restore colonial waterbird nesting habitat in the Galveston Bay System. Restoration actions at the rookery island would increase the amount of available nesting habitat by increasing the size of the island, enhance the quality of habitat through the establishment of native vegetation, and increase the longevity of the habitat through the construction of protective features, such as breakwaters or armoring. Increasing the amount of available nesting habitat, enhancing the quality of habitat, and increasing the protection of the habitat from erosion and sea level rise would result in an increase in the numbers of nesting colonial waterbirds.

Restoration and protection of Rollover Bay Island is needed to protect the island from land loss associated with erosion and relative sea level rise. It will also increase the island size and elevation such that it will provide sufficient area and height to support colonial nesting birds. Erosion and subsidence have decreased the size of Rollover Bay Island from over 5 acres in 1982 to less than 1 acre in 2014. The island has continued to decrease in size resulting in habitat that is no longer suitable for bird nesting.

#2 How do you plan to accomplish it? Describe in detail the construction equipment and methods needed; permanent vs. temporary impacts; duration of temporary impacts; dust, erosion, and sedimentation controls; restoration areas; if the project is growth-inducing or facilitates growth; whether the project is part of a larger project or plan; and what permits will need to be obtained.**

The project is currently conceptual in its design. A professional registered engineer (PE) will be hired to develop a refined design and specification package. The description of each of the construction elements are based on experience with similar projects within Galveston Bay and should be considered typical. Uncontaminated earthen fill will be placed on submerged bay bottom adjacent to the existing island and on top of any of the remaining island to raise elevations. Island construction would use clean sediments consisting of clay, silts, and sand, which would be sculpted to prescribed slopes and elevations. Depending on specific construction techniques, temporary levees may be constructed to contain material and decant water. Once the earthen fill has dewatered and sediments have settled, a portion of the island will be planted with shrub-scrub vegetation to support nesting birds. In order to protect the island from adverse physical processes, armored shorelines would be constructed to ensure sustainability. The target elevation for the restored island would place the crown at least 4 feet above mean tide level post-settlement sloping to existing natural grades. The island would be sloped into the

tidal zones at both ends of the island to provide access for colonial waterbirds Rollover Bay Island project contains the following elements:

- Construct 10 island acres by placing clean fill over submerged land or existing land (if present);
- Construct 4,500 feet armored levees to protect the restored island;
- Plant 4 island acres with native shrub/scrub vegetation; and
- Create a mitigation area (if needed) for impacts to hard bottom substrate.

A temporary access channel to the island may be required from the GIWW to the island site (about 600 feet) or from the borrow source area to the island (about 2,000 feet). This channel would be no more than 50 feet wide and no more than 5 feet deep (Figure 4) and will be back-filled upon project completion.

Island Fill

Approximately 80,000 cubic yards of uncontaminated earthen fill material will be required to raise elevations of the island to the appropriate height (Figure 4). The volume of earthen fill material is the maximum amount of material estimated to be needed. Fill material will be sourced from a direct dredge borrow source area (Figure 4), beneficial use of dredged material from the GIWW including material from USACE placement areas (Figure 5) or an upland borrow site. Borrow sites determined to be suitable from an engineering perspective would be evaluated for environmental conditions to ensure that any cultural and/or sensitive resources are properly addressed. For any of these borrow sites, the material would be mixed with water, requiring a settlement period and the controlled discharge of decant water from within the placement area. The height of any temporary or permanent structure and construction methods required to contain the earthen fill would be determined by the type of material used and its estimated water content. Location of the structures would ensure containment and settlement of the fill materials, using BMPs.

All environmental reviews required for the placement of the material obtained as part of a beneficial use disposal process would be completed by the other project (e.g. a navigation improvement project). If a beneficial use site under NOAA's jurisdiction is selected, documentation of the environmental reviews and relevant consultations will be provided to NMFS, as appropriate. If a direct dredge borrow source area is used, the borrow area would be located as near the island as feasible and would use surface bay bottom sediments. If earthen fill material is obtained from a more distant borrow area such as an upland site, the material would meet engineering requirements and the site would be reviewed and approved by resource agencies for cultural and sensitive resources including at-risk species, protected species, wetlands, contaminants, and cultural resources.

Measures to control turbidity caused by construction activities, decant water, and sediment movement would be in place to ensure sensitive habitats are protected, water quality standards are met, and sensitive resources are not affected. These measures may include appropriate water control structures (structures that allow water to exit the placement area while at the same time retain sediments within

the placement area) to decant water, as well as the installation of silt fences, hay bales, filter-fabric, and/or temporary levees to control sediments and avoid negative impacts associated with the fill placement.

If mitigation is necessary for impacts to hard bottom substrate, additional habitat will be created (Figure 4). The source of the material used for mitigation will emulate the shell hash present in structure, form, and mineral composition (calcareous). This material will be obtained from commercially available sources.

In general, construction may require the use of barges, small watercraft, large track hoe excavators, earth moving equipment, hydraulic or mechanical dredges, and a dockside staging area. The type of dredge chosen for use will not affect sea turtles. For example, a cutterhead dredge is the hydraulic dredge that is anticipated for use. Hopper dredges will not be used for the project. The mechanical dredge used by this project would be a dragline. Methods and tools will be approved by the professional engineer and the project team prior to implementation.

Equipment and materials for the construction activities would be transported via roads and via marine waterways. The nearby boat dock at Dr. Lloyd K. Lauderdale Public Boat Ramp, which is about a half mile away, may be used to load and transport materials. Large equipment and materials moved by barges or other vessels will use the established interconnected waterways. This may include the Gulf Intercostal Waterway (GIWW), the Houston Ship Channel and/or other navigation channels (Figure 4; NOAA navigational charts for Galveston/Houston: <http://xpda.com/nauticalcharts/>). The Texas General Land Office has identified places to access to coastal waterways at http://www.glo.texas.gov/texas-beach-access/beach_bay.html. Information specific to Galveston County is located at <http://www.glo.texas.gov/texas-beach-access/pdf/beach-bay/Galveston.pdf>.

The island restoration area and the location where fill material will be obtained will have a staging area identified. The locations for staging sites will be placed to avoid sensitive resource areas such as oyster reefs and seagrass beds. Equipment may be staged at these locations for a period of time up to several weeks and or months. The staging areas will be adjacent to the location where sediment sources are obtained (USACE placement area, the direct dredge borrow source area, GIWW or other upland location).

Direct Dredge Borrow source area

A direct borrow source may be used to obtain the earthen fill material required to build the island. The location of the direct dredge borrow source area is shown on Figure 4. Within that area, the specific location chosen will be based on several factors including the absence of sensitive resources (e.g. oyster reef or seagrasses), geotechnical and sediment quality, nearby commercial and/or recreational activities, and lateral extent of available material (avoiding a deep borrow site). Within the direct dredge source area, the PE will perform geotechnical investigations to determine potential sources of preferred and suitable sediments. Any potential sources that contain sensitive resources such as oyster reef or seagrass beds will be avoided. The resulting footprint of the borrow site within the direct dredge

source area will be no larger than 562,500 square feet of similar length and width with a depth of no more than 5 feet below grade. Although this direct dredge source area is much larger than needed, it is anticipated that approximately only 80,000 cubic yards of material would be dredged to provide the fill material needed for island construction. The shallow depth of 5 feet below grade shall minimize the potential for anoxic conditions occurring within the borrow site.

Material from the source area would be mechanically excavated or hydraulically dredged. Excavators used may include a dragline or a long-arm excavator to place material on barges for transport from the borrow site to the island site. The dredging equipment would include a hydraulic dredge that would be a cutter-head design (NOAA 2007) or mechanical dredge because it does not pose a risk to pelagic aquatic organisms. Placement of dredge pipe will avoid disturbance to sensitive resource areas such as oyster reefs and seagrass beds. The pipe would be routed to avoid laying on top of these resource areas and any equipment will avoid them as well. Any areas containing such resources in the construction and transport area of each project site will be visibly marked prior to start of construction. Material would be transported to the island from the borrow site area via a hydraulic dredge pipeline or by barge if a mechanical dredge is used.

Other sources of fill material

Sources of fill material other than that from the direct dredge borrow source area may be used. A form or method of beneficial use of dredged material is to mine existing material placement areas (PA) that are associated with federally maintained navigation channels. Potential sources of material within PAs exist for Rollover Bay Island. Based on conversations with the USACE, placement areas 36 and 42 have a high probability of being suitable for this project. These PAs are maintained and operated as part of the GIWW federal project. Material would be mined using mechanical or hydraulic excavation techniques. Mechanically excavated material would be placed on barges and transported to the island site using ingress and egress routes depicted in Figure 5.

For other upland borrow areas, the contractor will be required to provide documentation that the borrow site meets all engineering, environmental and cultural resource requirements. No upland borrow will be used that affects wetlands or listed species, or to the max extent practicable, at-risk species. Mechanical dredges and barges will be used to mine and transport upland material used for fill. Earthen fill material may be obtained as part of a beneficial use project and be sourced from the GIWW. If a beneficial use site under NOAA's jurisdiction is selected, documentation of the environmental reviews and relevant consultations will be provided to NMFS, as appropriate.

Breakwater/Armored Levee

Breakwaters or armored levees would be installed to protect the island from erosional forces. However, they could be modified or enhanced as part of this project to act as containment for the earthen fill. Graded stone, typically limestone will be used to construct the breakwaters or armoring. The amount and size of rock used will be dependent on several factors determined in the final design. These include wave and current energy expected, as well as whether the breakwaters or armored levees would be

used for containment and dewatering of sediments or only for erosion protection. Breakwaters and levees used for containment are typically higher in elevation and larger than those used solely for erosion protection. These considerations along with physical data from the site will be evaluated by a qualified coastal PE and the project team prior to selection of design. The project team will include staff from Texas Parks and Wildlife Department (TPWD), USFWS, and Audubon. The source for the material is expected to be from known and existing limestone quarries used for coastal construction projects across the western Gulf of Mexico. During construction, open tidal water areas of the site may need to be enclosed to contain material meeting standards specified for the project. Any such affected open water areas would follow Measures for Reducing Entrapment Risk to Protected Species, May 22, 2012. (http://sero.nmfs.noaa.gov/protected_resources/section_7/guidance_docs/documents/entrapment_bmps_final.pdf).

Potential Mitigation Area for Hard Bottom Substrate

The bottom substrate surrounding the island site contains patches of winnowed oyster shell (fossil) from former islands. This substrate is not active accreting reef, but it is an important habitat. Therefore any unavoidable impacts to hard shell substrate caused by the placement of material for the island restoration may require compensation as a result of consultations with natural resource agencies. Material placed onto Rollover Bay Island would be added in a manner that it emulates shell berms observed in nearby areas. The source of this material will be similar to the shell hash present at the site in Rollover Bay Island in structure, form, and mineral composition (calcareous). This material will be inspected, clean, free of debris and invasive species, and be obtained from commercially available sources.

Vegetation Planting

Once the earthen fill has dewatered and sediments have settled, four acres of the higher elevations of the restored island will be planted with shrub-scrub vegetation to help promote desired vegetation establishment. Plants used will be species documented from similar island sites and be propagated from stock located on the upper Texas coast. Species under consideration include but are not limited to those shown in Table 2. A Vegetation Planting Plan modified from and based on the Natural Resources Conservation Service (NRCS) Publication NRCS-TX-612 would be developed prior to implementation (NRCS 2013). This plan will provide specifications for the species of native vegetation to be used; acceptable source stock; planting densities and locations on the island for planting; survival targets and adaptive management strategies. The plan will be used by the contractor and the project team. Expected plants survival is approximately 60% at the end of the 5-year monitoring period. Protective measures may include trunk collars or wire exclusion cages to protect saplings from herbivory or trampling during the first few years after planting. Time of year as well as substrate salinity will determine the timing for planting. It is anticipated that this will take place approximately one year after construction, depending on environmental conditions.

Table 2. Examples of native scrub shrub species proposed for transplanting.

Common Name	Scientific Name
Colima	<i>Zanthoxylum fagara</i>
Woollybucket Bumelia	<i>Sideroxylon lanuginosum</i>
Prickly Pear Cactus	<i>Opuntia dillenii</i>
Desert Olive	<i>Forestiera augustifolia</i>
Huisache	<i>Acacia farnesiana</i>
Jerusalem Thorn	<i>Parkinsonia aculeata</i>

Construction Schedule

Activities associated with engineering and design may take several months to accomplish with an estimated timeframe of 18 months. Dredging activities will be conducted both day and night. To prevent disturbance to nearby residential communities, construction activities that produce significant noise or require precision, such as moving or placing rock would be limited to daylight hours. Construction noise would be temporary and the construction period is not anticipated to last more than 12 months. If it appears that birds will nest on Rollover Bay Island, construction would avoid the nesting season, which is usually February 1 through August 15. Activities associated with construction, which includes “in water work” are not expected to take longer than 12 months. However, some field activities that pose minimal disturbance may be acceptable to occur while birds are nesting. Any such activities potentially affecting migratory birds would be coordinated and approved by the appropriate state and federal agency biologists and with non-governmental organization (NGO) partners prior to initiation of the field work.

Describe permanent and temporary impacts, duration of temporary impacts, dust, erosion, and sedimentation controls

Construction activities will cause temporary impacts to wildlife due to the presence of people and use of heavy equipment on the island and in the borrow area. These impacts would last for the duration of construction, which is estimated to be less than 12 months. Permanent impacts will result from the expansion of the current island to 10 acres. If necessary, a mitigation area for impacts to hard bottom substrate will be created adjacent to the island. If needed, a temporary access channel will be excavated so that equipment can access the island and will be backfilled after construction is completed, approximately 12 months.

If the borrow source area is used, a borrow site approximately 12 acres (562,500 square feet) in size and no deeper than 5 feet below grade would be excavated. This site would slowly accrete sediments delivered from tidal actions between the bay and the Gulf. Some turbidity would take place but be

minimized by operation through the use of silt fences and other water quality BMPs. Impacts associated with beneficial use of dredged material would include some turbidity; however, it would be minimized through the use of appropriate BMPs. These measures include appropriate water control structures to decant water such as silt fences, hay bales, filter-fabric, and temporary levees to control sediments and avoid negative impacts associated with the fill placement.

There will be no significant impacts due to dust because sediments deposited will be mixed with water, keeping airborne particles to a minimum. In addition, the island is uninhabited and will not be affecting any residents. Impacts due to dust and erosion would also be minimized by the best management practices that were discussed above. No hazardous waste would be created during construction. All hazardous substances handled during construction would be contained and appropriate barriers would be in place to ensure the protection of adjacent water resources from potential spills and leaks. In the event of a discharge of oil or release of hazardous substances, the release would be reported to the National Response Center (800-424-8802) and Texas Emergency Oil Spill and Hazardous Substance Reporting line (800-832-8224) as required. BMPs in accordance with Occupational Safety and Health Administration and state and local requirements would be incorporated into construction activities on site to ensure the proper handling, storage, transport and disposal of all hazardous materials.

Permanent impacts result from an alteration in habitat type which will benefit nesting birds in the long-term. Beyond the vegetated plantings, natural colonization will occur and will provide, in part, grassy substrate which could be used by the colonial nesting birds. The breakwaters, armored levees, other levee and land height would protect the site from erosion.

Is the project part of a larger project or plan?

This project is one of four bird rookery restoration projects to occur in Texas as part of Phase IV Early Restoration funding from the BP oil spill (Figure 1). Restoration and protection of the Galveston Bay rookery islands, including Rollover Bay Island, supports the needs or goals of multiple conservation plans. Plans include but are not limited to the following national, state and regional planning documents:

- The Galveston Bay Plan: The Comprehensive Conservation and Management Plan for the Galveston Bay Ecosystem (Galveston Bay Estuary Program [GBEP] 1994);
- Galveston Bay Habitat Conservation Blueprint: A Plan to Restore the Habitats and Heritage of Galveston Bay Habitat (Galveston Bay Foundation 1998);
- Waterbird Conservation for the Americas: The North American Waterbird Conservation Plan, Version 1 (Kushlan et. al. 2002);
- Southeast United States Regional Waterbird Conservation Plan (U.S. Fish and Wildlife Service [USFWS] and North Carolina Audubon Society 2006);
- Strategic Plan: The Coastal Program Stewardship of Fish and Wildlife Through Voluntary Conservation Regional Step-Down Plan Region 2 (Texas) Part 2 of 3 FY 2006-2010 (USFWS 2006);
- Charting the Course to 2015: Galveston Bay Strategic Action Plan (GBEP 2009);

- Gulf Coast Joint Venture Conservation Planning for Reddish Egret (Vermillion and Wilson 2009);
- Texas Conservation Action Plan 2012 – 2016: Gulf Coast Prairies and Marshes Handbook (Texas Parks and Wildlife Department [TPWD] 2012);
- Texas Mid-Coast Initiative Area Fact Sheet (Gulf Coast Joint Venture 2012);
- Reddish Egret Conservation Action Plan (Wilson et. al. 2014); and
- Draft Texas Colonial Waterbird Rookery Island Conservation Plan (Audubon Texas 2014).

The information provided in each of the planning documents listed above may be for a specific species or may target a group or guild of waterbirds. Actions or recommendations in each may be directly related to restoration of a specific island; typical nesting islands, or emphasizes the need of a species that will benefit from the Galveston Bay rookery islands.

What permits will need to be obtained?

A USACE permit will be needed for this project. Audubon has a lease from the Texas General Land Office. Any additional lease(s) for managing the submerged bay bottom and the construction activities would be obtained prior to implementing the proposed restoration.

#3 Attach a separate map showing project footprint, avoidance areas, construction accesses, staging/laydown areas. **If construction involves overwater structures, pilings and sheetpiles, boat slips, boat ramps, shoreline armoring, dredging, blasting, or artificial reefs, list the method here, but complete the next section(s) in detail.

Rollover Bay Island is located north of the GIWW within Rollover Bay which is part of East Bay (Figure 3). The area that may be directly or indirectly affected includes the construction footprint, source of fill material (direct dredge borrow source area, USACE placement area, or the section of the GIWW that was dredge and the material was beneficially used for this project), navigation corridors, construction and staging areas (Figures 4 and 5).

Materials for the construction activities would need to be transported via roads and via marine waterways. The nearby boat dock/ramp, Dr. Lloyd K. Lauderdale Public Boat Ramp may be used to load and transport materials. GLO has identified places to access to coastal waterways at http://www.glo.texas.gov/texas-beach-access/beach_bay.html. Information specific to Galveston County access points and available activities is located at <http://www.glo.texas.gov/texas-beach-access/pdf/beach-bay/Galveston.pdf>. In addition, marine vessels including barges would use existing navigational waterways. Vessels will not use navigation channels as a staging area. Waters north of the GIWW will be used as a staging area. All equipment, vessels, and people will avoid piping plover critical habitat (Figure 6).

Part 3: Specific In-Water Construction Methods (Provide a detailed account of construction methods. It is important to include step-by-step descriptions of how demolition or removal of structures is conducted and if any debris will be moved and

how. Describe how construction will be implemented, what type and size of materials will be used and if machines will be used, manual labor, or both. Indicated if work will be done from upland, barge, or both.)

See above.

a. Overwater Structures

#1 Is the proposed use of this structure for a docking facility or an observation platform? No

#2 If no, is this a fishing pier? Public or Private? How many people are expected to fish per day? How do you plan to address hook and line captures? This is not a fishing pier.

#3 Use of "Dock Construction Guidelines"?

<http://sero.nmfs.noaa.gov/pr/Endangered%20species/Section%207/DockGuidelines.pdf>

This is not applicable. No dock is being constructed.

#4 Type of decking: Grated – 43% open space; Wooden planks or composite planks – proposed spacing? There is no decking

#5 Height above Mean High Water (MHW) elevation?

The target elevation for the restored island would place the crown at least 4 feet above mean tide level post-settlement sloping to existing grades. These elevations could be adjusted once the designs are finalized. Land heights will be appropriate for ground nesting birds.

#6 Directional orientation of main axis of dock?

Not applicable.

#7 Overwater area (sqft)?

Not applicable.

8 Use of "Sea Turtle and Smalltooth Sawfish Construction Conditions, March 2006"

<http://sero.nmfs.noaa.gov/pr/Endangered%20species/Sea%20Turtle%20and%20Smalltooth%20Sawfish%20Construction%20Conditions%203-23-06.pdf>

These construction guidelines will be followed for the in-water work.

b. Pilings & Sheetpiles (What type of material is the piling or sheetpiles? What size and how many will be used? Method used to install: impact hammer, vibratory hammer, jetting, etc.?) Not applicable.

c. Boat Slips (Describe the number and size of slips and if the number of new slips changes from what is currently available at the project. Indicate how many are wet slips and how many are dry slips. Estimate the shadow effect of the boats - the area (sqft) beneath the boats that will be shaded.) Boat slips are not part of this project.

d. Boat Ramp (Describe the number and size of boat ramps, the number of vessels that can be moored at the site (e.g., staging area) and if this is a public or private ramp. Indicate the boat trailer parking lot capacity, and if this number changes from what is currently available at the project.) Boat ramps are not part of this project.

- e. **Shoreline Armoring (This includes all manner of shoreline armoring (e.g., riprap, seawalls, jetties, groins, breakwaters, etc.). Provide specific information on material and construction methodology used to install the shoreline armoring materials. Include linear footage and square footage. Attach a separate map showing the location of the shoreline armoring in the project area.)**

Figure 4 shows the location of shoreline armoring. See above for a description of shoreline armoring and a typical design can be considered in Figure 7.

Measures for Reducing Entrapment Risk to Protected Species, dated May 22, 2012 will be followed (http://sero.nmfs.noaa.gov/protected_resources/section_7/guidance_docs/documents/entrapment_bmps_final.pdf).

- f. **Dredging or digging (Provide details about dredge type (hopper, cutterhead, clamshell, etc.), maximum depth of dredging, area (ft²) to be dredged, volume of material (yd³) to be produced, grain size of material, sediment testing for contamination, spoil disposition plans, and hydrodynamic description (average current speed/direction)). See Section D, Part 2.**

Construction activities at the site would include the placement of approximately 80,000 cubic yards of earthen fill to create an island. A temporary access channel would be constructed to access the site from the nearby navigation channel. It would be approximately 650 feet by 50 feet and no more than 5 feet deep. This material would be sidecast and backfilled once construction is completed. Once the temporary access channel is in place, approximately 4,500 feet of breakwaters, armored levees, or other levee would be constructed to inhibit erosion. This structure may also be used to contain the clean fill material. The restored island would be protected by the armored levees along its vulnerable sides. The island would be sloped into the tidal zones at both ends of the island to provide access for colonial waterbirds. About 4 acres of the island with higher elevations would be planted with native shrub/scrub vegetation. A small area has also been identified for mitigation to hard bottom substrate if it is needed. Any encirclement of water would follow the guidelines indicated in 8.e. above. Appropriate measures to reduce impacts from decant water will be used (see below). Material placed to create the island may require a drying period prior to shaping and sculpting with earth moving equipment.

A borrow site may be used to obtain the source material. A direct dredge borrow source area has been identified and is shown in Figure 4 and is bounded by the following coordinates: 29.57600 E, -94.51450 W; 29.53050 E, -94.50510 W; 29.52780 E, -94.50420 W; 29.52520 E, -94.5137 W (NAD 83). A small area within the direct dredge borrow source area would be used to provide fill material for this project. The area excavated would be approximately 562,500 square feet in area and would be no deeper than 5 feet below grade. A temporary access channel would be required to support construction equipment between the island and the borrow source area. The temporary access channels, if needed, would be no more than 3,100 feet in length with a width of 50 feet and a depth such that it provides a 5-foot draft to facilitate vessel access. The most desirable material used as

fill for the island would have a relatively high sand content. However, material comprised of silts and clays would also be acceptable. Once identified, the specific site would be surveyed for important habitats such as oyster reef and seagrasses and for cultural resources. Any important sensitive resources would be avoided. Over time the excavated area would accrete sediments delivered from riverine or tidal sources and movement from surrounding bay bottoms. Some turbidity would take place but be minimized by operation during cooler months of the year and through the use of silt fences and other water quality BMPs. Impacts associated with beneficial use of dredged material would include some turbidity; however, it would be minimized through the use of appropriate BMPs. These measures include appropriate water control structures to decant water such as silt fences, hay bales, filter-fabric, and temporary levees to control sediments and avoid negative impacts associated with the fill placement. There is no known contaminants associated with the borrow source area.

There are no known contaminants associated with the direct dredge borrow source area. Screening for potential chemical contaminants will be conducted on a case-by-case basis.

For sediments from federally-maintained navigation channels or associated dredged material placement areas, previously collected contaminant analysis and bio-assay data will be obtained from the USACE Galveston District - Operations Branch records.

For bay bottom borrow sites, local and regional knowledge of historical industrial activities as well as regulatory documentation on past and existing facilities in the vicinity of potential sediment borrow sources will be used to determine the likelihood and type of contaminants that might be expected to be encountered during construction. Based upon this information, USACE and state and federal resource agency personnel will be consulted to determine the amount of sampling and the type of chemical analyses that may be needed.

Equipment and materials for the construction activities would be transported via roads and via marine waterways. Large equipment and materials moved by barges will use the established interconnected waterways. This may include the Gulf Intracoastal Waterway, the Houston Ship Channel and other navigation channels (Figure 5). The island restoration area and the location where fill material will be obtained will have a staging area identified. The locations for staging sites will be placed to avoid sensitive resource areas such as oyster reefs and seagrass beds. Equipment may be staged at these locations for a period of time up to several weeks and or months. The staging areas will likely be adjacent to Rollover Bay Island and the location where sediment sources are obtained (GIWW) or the direct dredge borrow source area.

There will be no significant impacts due to dust because sediments deposited will be mixed with water, keeping airborne particles to a minimum. In addition, the island is uninhabited and will not be affecting any residents. Impacts due to dust and erosion would also be minimized by the best management practices that were discussed above. No hazardous waste would be created during construction. All hazardous substances, such as oils, hydraulic fluids, and fuels, handled during

construction would be contained and appropriate barriers would be in place to ensure the protection of adjacent water resources from potential spills and leaks. In the event of a discharge of oil or release of hazardous substances, the release would be reported to the National Response Center (800-424-8802) and Texas Emergency Oil Spill and Hazardous Substance Reporting line (800-832-8224) as required. BMPs in accordance with Occupational Safety and Health Administration and state and local requirements would be incorporated into construction activities on site to ensure the proper handling, storage, transport and disposal of all hazardous materials.

Permanent impacts result from an alteration in habitat type which will benefit nesting birds in the long-term. Beyond the vegetated plantings, natural colonization will occur and will provide, in part, grassy substrate which could be used by the colonial nesting birds. The breakwaters and/or armored levees would decrease wave energy. Surveys delineating the presence, type and extent of bottom substrates and sensitive habitats will be completed prior to finalizing full project elements and design.

The construction activities including transportation, mining and transportation of fill material, and staging areas associated with the restoration of Rollover Bay Island will not adversely affect any sensitive resources. Sediment and turbidity controls will be in place so that the surrounding sensitive habitats (oyster reefs and/or seagrass beds) are not significantly affected. Although there will be noise and equipment activity associated with movement of construction materials, mobile organisms will avoid the area which will eliminate the chance for significant impacts to these resources. Some sessile organisms may be affected; however, best management practices will be employed to prevent any impacts to fish and wildlife and/or sensitive resources such as oyster reef beds. Refer to descriptions below for further details.

Several different types of barges and vessels may be used in construction operations. A hydraulic cutter-head dredge vessel would be used in conjunction with this method for moving material from the borrow site to the island construction site. Smaller water craft may also be used to transport personnel and small quantities of material between larger barges and vessels. In general, all types of barges will be operated to avoid depths inconsistent with their draft. Barges bearing significant amounts of material from source sites, e.g. limestone rock, will be staged near but outside of navigation channels. When appropriate, material will be transferred to barges of shallower draft (placement barges) in order to reach the site. Barges containing work equipment such as excavators and/or draglines would also be used. Propeller wash of the bay bottom and substrate will be avoided. Construction activities may require excavation of a temporary access channel from the barge draft limit to the island. The access channels, which would only be constructed if needed, are expected to be no deeper than 5 feet, have a maximum width of 50 feet, and a maximum length of 3,100 feet. Once all the fill materials and protective structures have been constructed, the access channels will be backfilled, thus preventing any long-term impacts to the bay bottom from the access channel construction.

- g. Blasting (Projects that use blasting might not qualify as “minor projects,” and a Biological Assessment (BA) may need to be prepared for the project. Arrange a technical consultation meeting with NMFS Protected Resources Division to determine if a BA is necessary. Please include explosive weights and blasting plan.)**. This project does not involve blasting activities.
- h. Artificial Reefs (Provide a detailed account of the artificial reef site selection and reef establishment decisions (i.e., management and siting considerations, stakeholder considerations, environmental considerations), deployment schedule, materials used, deployment methods, as well as final depth profile and overhead clearance for vessel traffic. For additional information and detailed guidance on artificial reefs, please refer to the artificial reef program websites for the particular state the project will occur in. Artificial reef creation is not part of this project.**

Section E.

#1 List all species, critical habitat, proposed species and proposed critical habitat that may be found in the action area.

There is no critical habitat within the action area. Attwater's Greater prairie chicken, *Tympanuchus cupido attwaterii* – Endangered

Piping plover, *Charadrius melodus* – Threatened

Red knot, *Caladris canutus rufa* – Threatened

Sprague's Pipit, *Anthus spragueii* – Candidate Species

West Indian Manatee, *Trichechus manatus* – Endangered

Green Sea Turtle, *Chelonia mydas* – Endangered *

Hawksbill Sea Turtle, *Eretmochelys imbricata* – – Endangered*

Kemp's Ridley Sea Turtle, *Lepidochelys kempii* – – Endangered*

Leatherback Sea Turtle, *Demochelys coriacea* – – Endangered*

Loggerhead Sea Turtle, *Caretta caretta* – – Threatened*

Smalltooth Sawfish, *Pristis pectinata* – Endangered

* - This biological assessment is limited to potential impacts to these species within the bay and outside of their nesting habitat (beaches) since there is no nesting habitat within the action area. This project will have no impacts or influence to Gulf beach front.

#2 Attach a separate map identifying species/critical habitat locations within the action area.

The attached maps are indicative of species locations as displayed by USFWS. There is no critical habitat for any species within the project area. Distribution maps were downloaded from the USFWS Ecological Services webpage for Region 2 on 27 February 2015

(http://www.fws.gov/southwest/es/ES_ListSpecies.cfm).

Section F

Part 1:

Explain the potential beneficial and adverse effects to each species listed above (Describe what, when, and how the species will be impacted and the likely response to the impact. Be sure to include direct, indirect, interdependent, interrelated, connected actions, and cumulative impacts. Where possible, quantify effects. If species are present (or potentially present) and will not be adversely affected describe your rationale. If species are unlikely to be present in the general area or action area, explain why. This justification provides documentation for your administrative record, avoids the need for additional correspondence regarding the species, and helps expedite review.)

Attwater's Greater prairie-chicken:

There will be no effects to this species. The species occupies large expanses of coastal prairie which does not exist on Rollover Bay Island and the species has been extirpated from Galveston County.

Piping Plover:

The project may affect but is not likely to adversely affect this species. The piping plover is a winter resident on the Texas coast and occurs in Galveston County. However, there are no documented records of piping plovers on Rollover Bay Island. Piping plovers are not expected to occur in the construction area because typical habitats, beach and bayside tidal flat habitats, for the species do not exist. Construction activities will occur when the species is present along the Texas coastline. Individual piping plovers could rest at Rollover Bay Island. Piping plovers, if present and disturbed by the noise, have access to nearby habitat that is within their normal flying distances for daily foraging movement.

Red Knot:

The project may affect but is not likely to adversely affect this species. The red knot is primarily migratory in Galveston County. However, there are no documented records of red knots on Rollover Bay Island. Red knots are not expected to occur in the construction area because typical habitats, beach and bayside tidal flat habitats, for the species do not exist. Construction activities will occur when the species is present along the Texas coastline. Individual red knots could rest at Rollover Bay Island. However, red knots, if present and disturbed by the noise, have access to nearby habitat that is within their normal flying distances for daily foraging movement. Upland excavation activities will not occur in habitat used by this species.

Sprague's Pipit:

The project may affect but is not likely to adversely affect this species. Habitat is not present on the open waters of the bay. If upland borrow source is used, the site may provide winter habitat for this species. Construction activities associated with an upland borrow site may occur in the winter when the species could be present. Sprague's pipit, if present and disturbed by the upland borrow site activities would have access to nearby habitat that is within their normal flying distances for daily foraging movement.

West Indian Manatee:

The project may affect but is not likely to adversely affect this species. This species rarely enters Texas waters and is not likely to occur in the action area. If present, the conservation measures below in Section G will be followed.

Green Sea Turtle:

This project may affect but is not likely to adversely affect this species. No sea turtle nesting activities are expected to occur here since there is no beach habitat. Green Sea Turtles do occur in Galveston Bay and may be in the water during construction activities including excavation of island building material on submerged lands near the island. However, methods used to remove material from the borrow site will be with a mechanical dredge (dragline) and barge or a hydraulic dredge (cutter-head) and pipeline dragline, both of which would have minimal impacts to pelagic species.

Impacts to bay bottom would have minimal impacts to foraging habitat for this species because this project will avoid and/or minimize impacts to seagrass beds and oyster reef habitats. Green sea turtles are specialist feeders that target sponges and seagrass or macroalgae. Substrate at the aquatic borrow areas largely consists of unvegetated sandy bottom.

Hawksbill Sea Turtle:

This project may affect but is not likely to adversely affect this species. No sea turtle nesting activities are expected to occur here since there is no beach habitat. This species is rarely seen in Galveston Bay. These sea turtles may be in the water during construction activities including excavation of island building material on submerged lands near the island. However, methods used to remove material from the borrow site will be with mechanical dredge (dragline) and barge or a hydraulic dredge (cutter-head) and pipeline, both of which would have minimal impacts to pelagic species.

Impacts to bay bottom would have minimal impacts to foraging habitat for this species because this project will avoid and/or minimize impacts to seagrass beds and oyster reef habitats. Hawksbill sea turtles are specialist feeders that target sponges and seagrass or macroalgae. Substrate at the dredging and disposal sites largely consists of unvegetated sandy bottom.

Kemp's Ridley Sea Turtle:

This project may affect but is not likely to adversely affect this species. No sea turtle nesting activities are expected to occur here since there is no beach habitat. Kemp's Ridley sea turtles do occur in Galveston Bay and may be in the water during construction activities including excavation of island building material on submerged lands near the island. However, methods used to remove material from the borrow site will be with a mechanical dredge (dragline) and barge or a hydraulic dredge (cutter-head) and pipeline, both of which would have minimal impacts to pelagic species.

The effects due to loss of foraging habitat on Kemp's ridley sea turtles are insignificant. This species is a generalist carnivore, typically preying on benthic mollusks and crustaceans in the nearshore environment. Kemp's ridley can be found foraging in shallow sandy habitat. However, any impacts to foraging habitat for Kemp's ridleys will be temporary and would only affect a small area relative to the foraging habitat available in the nearshore marine environment off Texas.

Leatherback Sea Turtle:

This project may affect but is not likely to adversely affect this species. No sea turtle nesting activities are expected to occur here since there is no beach habitat. This species is rarely seen in Galveston Bay. These sea turtles may be in the water during construction activities including excavation of island building material on submerged lands near the island. However, methods used to remove material from the borrow site will be with a mechanical dredge (dragline) and barge or a hydraulic dredge (cutter-head) and pipeline, both of which would have minimal impacts to pelagic species. Impacts to bay bottom would have minimal impacts to foraging habitat for this species since it is a pelagic feeder.

Loggerhead Sea Turtle:

This project may affect but is not likely to adversely affect this species. No sea turtle nesting activities are expected to occur here since there is no beach habitat. This species is rarely seen in Galveston Bay. These sea turtles may be in the water during construction activities including excavation of island building material on submerged lands near the island. However, methods used to remove material from the borrow site will be with a mechanical dredge (dragline) and barge or a hydraulic dredge (cutter-head) and pipeline, both of which would have minimal impacts to pelagic species.

The effects due to loss of foraging habitat on loggerhead sea turtles are insignificant. This species is a generalist carnivore, typically preying on benthic mollusks and crustaceans in the nearshore environment. Loggerheads can be found foraging in shallow sandy habitat. However, any impacts to foraging habitat for loggerheads will be temporary and would only affect a small area relative to the foraging habitat available in the nearshore marine environment off Texas.

Smalltooth Sawfish:

There will be no impacts to this species from this project. This species is considered extirpated in Texas.

Part 2:

Explain the potential beneficial and adverse effects to critical habitat listed above (Describe what, when, and how the critical habitat will be impacted and the likely response to the impact. Be sure to include direct, indirect, interdependent, interrelated, connected actions, and cumulative impacts. Where possible, quantify effects (e.g. acres of habitat, miles of habitat). Describe your rationale if designated or proposed critical habitats are present and will not be adversely affected.

The only critical habitat identified near the areas affected by the project is for the piping plover, shown in Figure 6. This critical habitat while close to the project area will not be affected for several reasons:

- The project activities are over 1,500 feet distant for the closest potential area that would be defined as critical habitat.
- It is separated from the action area by the GIWW.
- It is an extremely shallow water area that does not allow for vessel traffic.
- It will be identified to staff with flyers.
- It will be inserted as a contractual condition as an avoidance area.

The critical habitat delineated in Figure 6 is not in the action area and the construction of the island will not affect the way the piping plover critical habitat accretes or erodes. The piping plover critical habitat will be avoided by personnel associated with construction and will be communicated with construction operations. The construction activities will not have an effect on the critical habitat because the GIWW separates the area. Noise from the construction activities will not affect any nearby areas in which this species may use. The largest influences causing erosion, wave energy, noise, and increased salinities on the piping plover critical habitat are the GIWW and Rollover Pass. There have been proposals to close Rollover Pass (which would improve habitat in the area), but this has not been implemented. Upland excavation activities will not occur in habitat used by this species.

Section G

Part 1

Explain the actions to reduce adverse effects to each species listed above (For each species for which impacts were identified, describe any conservation measures (e.g. BMPs) that will be implemented to avoid or minimize the impacts. Conservation measures are designed to avoid or minimize effects to listed species and critical habitats or further the recovery of the species under review. Conservation measures are considered part of the proposed action and their implementation is required. Any changes to, modifications of, or failure to implement these conservation measures may result in a need to reinitiate this consultation.)

Attwater's Greater prairie-chicken:

There will be no effects to this species. No additional actions are necessary.

Piping Plover:

The project may affect but is not likely to adversely affect this species. The piping plover is a winter resident on the Texas coast and occurs in Galveston County. However, there are no documented records of piping plovers on Rollover Bay Island. Piping plovers are not expected to occur in the construction area because typical habitats, beach and bayside tidal flat habitats, for the species do not exist. Construction activities would occur between August 15 and February 1. Construction activities will occur when the species is present along the Texas coastline. Piping plovers, if present and disturbed by the noise, have access to nearby habitat that is within their normal flying distances for daily foraging movement. Upland excavation activities will not occur in habitat used by this species.

Red Knot:

The project may affect but is not likely to adversely affect this species. The red knot is primarily migratory in Galveston County. However, there are no documented records of red knots on Rollover Bay Island. Red knots are not expected to occur in the construction area because typical habitats, beach and bayside tidal flat habitats, for the species do not exist. Construction activities would occur between August 15 and February 1. Construction activities will occur when the species is present along the Texas coastline. Red knots, if present and disturbed by the noise, have access to nearby habitat that is within their normal flying distances for daily foraging movement. Upland excavation activities will not occur in habitat used by this species.

Sprague's Pipit:

The project may affect, but is not likely to adversely affect this species. Construction activities associated with an upland borrow site may occur in the winter when the species could be present. Sprague's pipit, if present and disturbed by the upland borrow site activities would have access to nearby habitat that is within their normal flying distances for daily foraging movement. No additional actions are necessary.

West Indian Manatee:

The project may affect but is not likely to adversely affect this species. All construction personnel will be notified of the potential presence of West Indian Manatee in the water and reminded of the criminal and civil penalties associated with harassing, injuring, or killing West Indian Manatees. All workers will be educated that there could be West Indian manatees in the water and will be advised to look for manatees and, if observed, wait until manatees leave the area to put the equipment in the water. Care will be taken when using equipment in the water to ensure that no harm is caused to any West Indian Manatee that may be nearby. Should a West Indian Manatee come within 50 foot of the project area during construction activities, work would immediately cease until the West Indian Manatee has moved away from the project area on its own. Construction noise will be kept to the minimum feasible.

Green Sea Turtle:

The project may affect but is unlikely to adversely affect this species. Sea turtle and smalltooth sawfish construction conditions and measures for reducing entrapment risk to protected species will be followed for all aspects of this project

(http://sero.nmfs.noaa.gov/protected_resources/section_7/guidance_docs/documents/sea_turtle_and_smalltooth_sawfish_construction_conditions_3-23-06.pdf;

http://sero.nmfs.noaa.gov/protected_resources/section_7/guidance_docs/documents/entrapment_bmps_final.pdf).

Methods used to remove material from the borrow site will be with a hydraulic dredge (cutter-head design) or a mechanical dredge (dragline) both of which would have minimal impacts to pelagic species. Sea turtles may be affected by dredging activities if they were to be struck by the transit and anchoring of the dredge at the project site or by the placement of fill material below mean high water. However, these effects are discountable because sea turtles are highly mobile and can avoid the area during dredging and sand placement activities and through the implementation of NMFS' Sea Turtle and Smalltooth Sawfish Construction Conditions. Application of fill material is a slow process allowing time for sea turtles to leave the area.

NMFS has previously determined that non-hopper-type dredging activities are unlikely to adversely affect sea turtles. Hydraulic dredges are not known to take sea turtles whereas hopper dredges are known to take sea turtles. Hopper dredges will not be used for the project.

Hawksbill Sea Turtle:

The project may affect but is unlikely to adversely affect this species. Sea turtle and smalltooth sawfish construction conditions and measures for reducing entrapment risk to protected species will be followed for all aspects of this project

(http://sero.nmfs.noaa.gov/protected_resources/section_7/guidance_docs/documents/sea_turtle_and_smalltooth_sawfish_construction_conditions_3-23-06.pdf;

http://sero.nmfs.noaa.gov/protected_resources/section_7/guidance_docs/documents/entrapment_bmps_final.pdf).

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DRAFT/DELIBERATIVE; ATTORNEY WORK PRODUCT; ATTORNEY CLIENT COMMUNICATION; PRIVILEGED AND/OR CONFIDENTIAL

NMFS has previously determined that non-hopper-type dredging activities are unlikely to adversely affect sea turtles. Hydraulic dredges are not known to take sea turtles whereas hopper dredges are known to take sea turtles. Hopper dredges will not be used for the project.

Leatherback Sea Turtle:

The project may affect but is unlikely to adversely affect this species. Sea turtle and smalltooth sawfish construction conditions and measures for reducing entrapment risk to protected species will be followed for all aspects of this project

(http://sero.nmfs.noaa.gov/protected_resources/section_7/guidance_docs/documents/sea_turtle_and_smalltooth_sawfish_construction_conditions_3-23-06.pdf;

http://sero.nmfs.noaa.gov/protected_resources/section_7/guidance_docs/documents/entrapment_bmps_final.pdf).

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NMFS has previously determined that non-hopper-type dredging activities are unlikely to adversely affect sea turtles. Hydraulic dredges are not known to take sea turtles whereas hopper dredges are known to take sea turtles. Hopper dredges will not be used for the project.

Kemp's Ridley Sea Turtle

The project may affect but is unlikely to adversely affect this species. Sea turtle and smalltooth sawfish construction conditions and measures for reducing entrapment risk to protected species will be followed for all aspects of this project

(http://sero.nmfs.noaa.gov/protected_resources/section_7/guidance_docs/documents/sea_turtle_and_smalltooth_sawfish_construction_conditions_3-23-06.pdf;

http://sero.nmfs.noaa.gov/protected_resources/section_7/guidance_docs/documents/entrapment_bmps_final.pdf).

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Smalltooth Sawfish Construction Conditions. Application of fill material is a slow process allowing time for sea turtles to leave the area.

NMFS has previously determined that non-hopper-type dredging activities are unlikely to adversely affect sea turtles. Hydraulic dredges are not known to take sea turtles whereas hopper dredges are known to take sea turtles. Hopper dredges will not be used for the project.

Loggerhead Sea Turtle:

The project may affect but is unlikely to adversely affect this species. Sea turtle and smalltooth sawfish construction conditions and measures for reducing entrapment risk to protected species will be followed for all aspects of this project

(http://sero.nmfs.noaa.gov/protected_resources/section_7/guidance_docs/documents/sea_turtle_and_smalltooth_sawfish_construction_conditions_3-23-06.pdf;

http://sero.nmfs.noaa.gov/protected_resources/section_7/guidance_docs/documents/entrapment_bmps_final.pdf).

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NMFS has previously determined that non-hopper-type dredging activities are unlikely to adversely affect sea turtles. Hydraulic dredges are not known to take sea turtles whereas hopper dredges are known to take sea turtles. Hopper dredges will not be used for the project.

Smalltooth Sawfish:

This project will have no effect on this species. It is considered extirpated from Texas.

Part 2

Explain the actions to reduce adverse effects to critical habitat listed above (For critical habitat for which impacts were identified, describe any conservation measures (e.g. BMPs) that will be implemented to avoid or minimize the impacts. Conservation measures are designed to avoid or minimize effects to listed species and critical habitats or further the recovery of the species under review. Conservation measures are considered part of the proposed action and their implementation is required. Any changes to, modifications of, or failure to implement these conservation measures may result in a need to reinstate this consultation.)

There is no critical habitat within the project area. However, Rollover Bay Island is located near (approximately 0.5 miles) critical habitat for the piping plover. All equipment, vessels, and people will avoid piping plover critical habitat. The GIWW, which is a major marine transportation corridor, is situated between the project area and the critical habitat. Therefore, the project would not impact critical habitat.

Section H. Effect Determination Requested

Attwater's Greater prairie chicken – No Effect

Piping plover – May Affect, Not Likely to Adversely Affect

Red knot – May Affect, Not Likely to Adversely Affect

Sprague's Pipit – May Affect, Not Likely to Adversely Affect

West Indian Manatee – May Affect, Not Likely to Adversely Affect

Green Sea Turtle – May Affect, Not Likely to Adversely Affect

Hawksbill Sea Turtle – May Affect, Not Likely to Adversely Affect

Kemp's Ridley Sea Turtle – May Affect, Not Likely to Adversely Affect

Leatherback Sea Turtle – May Affect, Not Likely to Adversely Affect

Loggerhead Sea Turtle – May Affect, Not Likely to Adversely Affect

Smalltooth Sawfish – No Effect

Section I. Bald Eagles

There are eagle home ranges or established territories within the rookery island areas. No eagles nest within 660 feet of Rollover Bay Island. If Bald Eagles are observed, these conservation measures will be followed:

1. If bald eagle breeding or nesting behaviors are observed or a nest is discovered or known, all activities (e.g., walking, camping, clean-up, use of a UTV, ATV, or boat) should avoid the nest by a minimum of 660 feet. If the nest is protected by a vegetated buffer where there is *no* line of sight to the nest, then the minimum avoidance distance is 330 feet. This avoidance distance shall be maintained from the onset of breeding/courtship behaviors until any eggs have hatched and eaglets have fledged (approximately 6 months).
2. If a similar activity (e.g., driving on a roadway) is closer than 660 feet to a nest, then you may maintain a distance buffer as close to the nest as the existing tolerated activity.

3. If a vegetated buffer is present and there is no line of sight to the nest and a similar activity is closer than 330 feet to a nest, then you may maintain a distance buffer as close to the nest as the existing tolerated activity.

4. In some instances activities conducted within 660 feet of a nest may result in disturbance, particularly for the eagles occupying the Mississippi barrier islands. If an activity appears to cause initial disturbance, the activity shall stop and all individuals and equipment will be moved away until the eagles are no longer displaying disturbance behaviors.

If these measures cannot be implemented, then you must contact the Service's Migratory Bird Permit Office.

Texas – (505) 248-7882 or by email: permitsR2MB@fws.gov

Section J. Migratory Birds

Rollover Bay Island provides some habitat for use by migratory birds. The island supports limited colonial waterbird nesting and little species diversity due to its diminishing size and habitat loss. Limited to no nesting took place during 2013 and 2014 on what remains of the island (Hackney and Woodrow, pers. comm. 2014). The island is rapidly eroding and there may or may not be nesting habitat present at the time of project implementation. If nesting activities are occurring, then the majority of construction activities will not occur during the nesting season, which is usually February 1 until August 15. However, some field activities that pose minimal disturbance may be acceptable to occur while birds are nesting. Any such activities potentially affecting migratory birds would be coordinated with the appropriate state and federal agency biologists and with non-governmental organization (NGO) partners prior to initiation of the field work.

Rollover Bay supports staging, resting, and roosting habitat for those species that used the site historically for nesting. Non-colonial waterbirds, primarily the American oystercatcher and eastern willet, may use the existing island for nesting as well. For non-breeding migratory birds the island currently supports roosting and limited foraging use. The different bird taxonomic guilds and use activities are listed below:

Loons and Grebes – This group of birds may use surrounding waters during the fall, winter, and spring to forage. Presence in the area would be based on available forage fish and invertebrates. Construction activities may cause the birds to move out of nearby foraging areas, however, no take is anticipated.

Waterfowl – Waterfowl use of the island is limited. Surrounding bay waters are used by several species of wintering waterfowl primarily bay ducks. This group may be affected by construction activities. The temporary nature of construction and this bird group's use of more undisturbed waters nearby will avoid take.

Pelicans and Cormorants – These will use the existing island for resting, staging and or roosting during the fall, winter and spring. Construction activities will cause the birds using the island to move to other sites. Acclimation to construction activities may take place.

Wading Birds – These heron and egret species may use the existing island to some degree for resting and may use the shallow intertidal zone to feed. This use would be limited.

Terns and Gulls – These species will use the island site for resting, staging and or roosting. Foraging areas would constantly change depending on the presence of forage fish, currents, etc. and thus may or may not be proximal to the site. These birds will move to other nearby sites in the bay system to use for these purposes.

Shorebirds – Significant numbers of shorebirds migrate through the Texas coast in the fall and spring and these may use the intertidal zone to forage. Several species overwinter as well and may use the intertidal areas of the existing island to forage. Construction activities may limit the use of the island by these birds. There are other sites nearby that would serve similar uses.

Construction activities would occur between August 15 and February 1. These activities would avoid nesting season if nesting habitat is present in the project area. Rollover Island may be completely eroded away by the time this project is implemented. The disruptions caused by construction activities during this period would be temporary and once completed the restored island would provide a greater range of habitats available for birds to use. Increased vegetation would improve habitats that are essential for nesting colonial waterbirds and provide a long-term benefit. Other nearby sites are available that support loafing and roosting birds. The proposed actions would support the project goal to increase the number of nesting pairs of colonial waterbirds. The proposed actions would also provide more opportunity for many of the above listed bird groups as well as other guilds during the non-nesting season.

Pre-existing NEPA Documents?

Yes

If tiered from a programmatic EIS or EA, then provide the programmatic document or a link below.

Tiered from the DWH ER Phase III ERP/PEIS, which can be found at:

<http://www.gulfspillrestoration.noaa.gov/restoration/early-restoration/phase-iii/>

Name of Person Completing this Form: Angela Schrift

Name of Project Lead:

Date Form Completed: 4/2/2015

Date Form Updated: 6/30/2015

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Figure 1. Location of proposed rookery island restoration and protection projects in Texas.

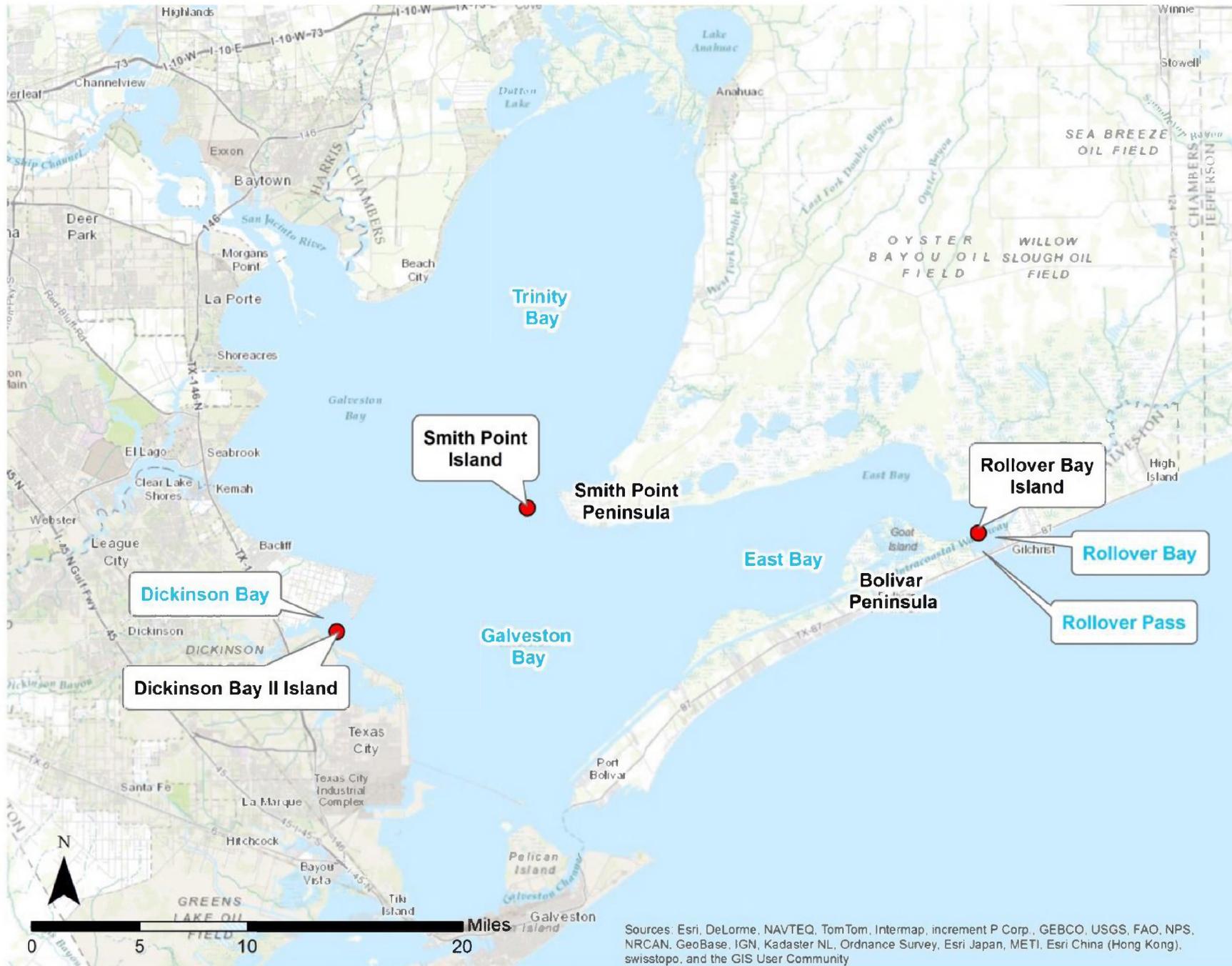


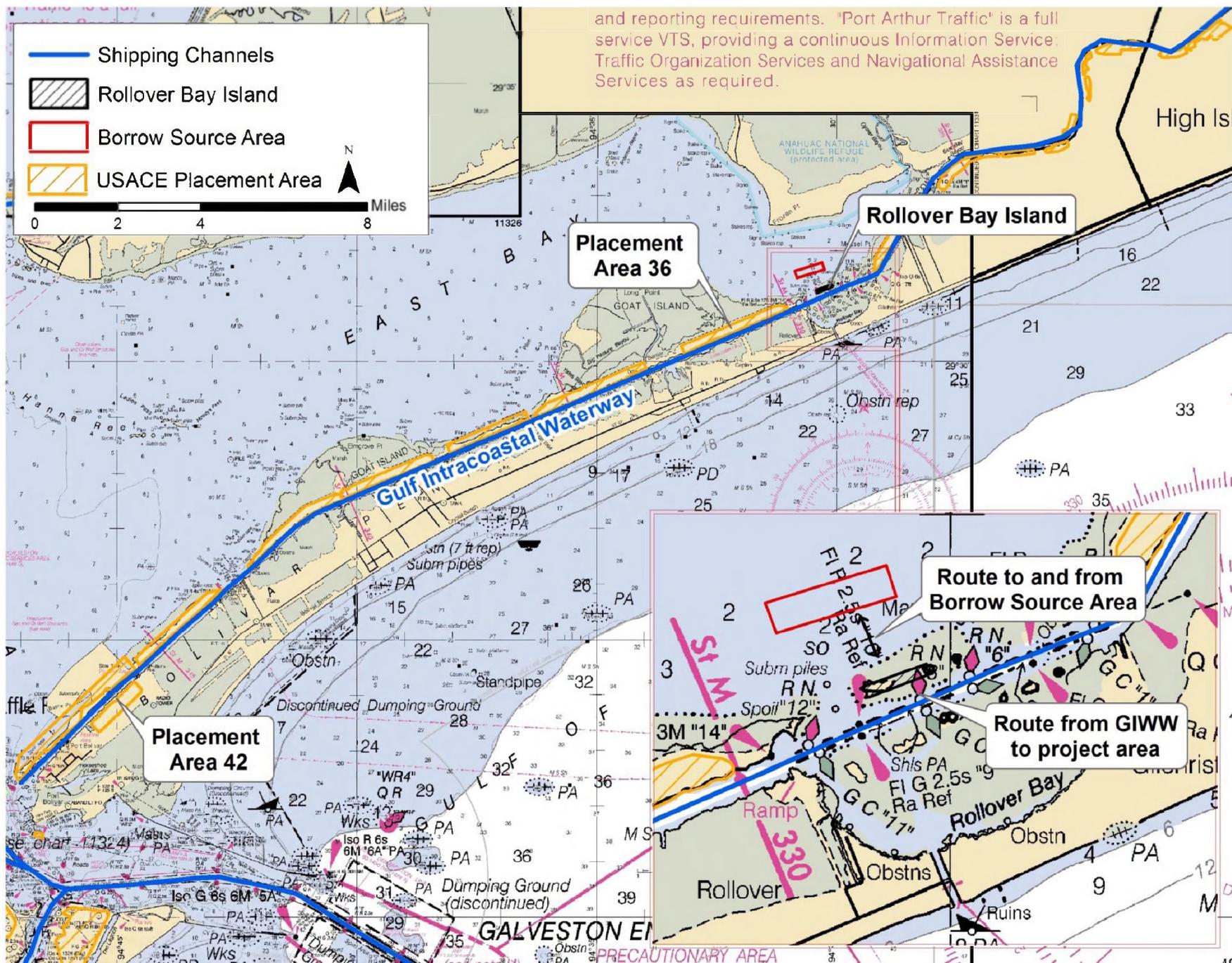
Figure 2. Location of proposed rookery island restoration and protection projects in Galveston Bay.



Figure 3. Location of Rollover Bay Island in East Bay, which is part of the Galveston Bay System.



Figure 4. Conceptual design plan for Rollover Bay Island.



and reporting requirements. "Port Arthur Traffic" is a full service VTS, providing a continuous Information Service, Traffic Organization Services and Navigational Assistance Services as required.

Figure 5. Shipping channels, navigation routes, potential borrow sites (i.e., shipping channels, direct dredge borrow source area, and USACE placement areas where sediments may be mined).

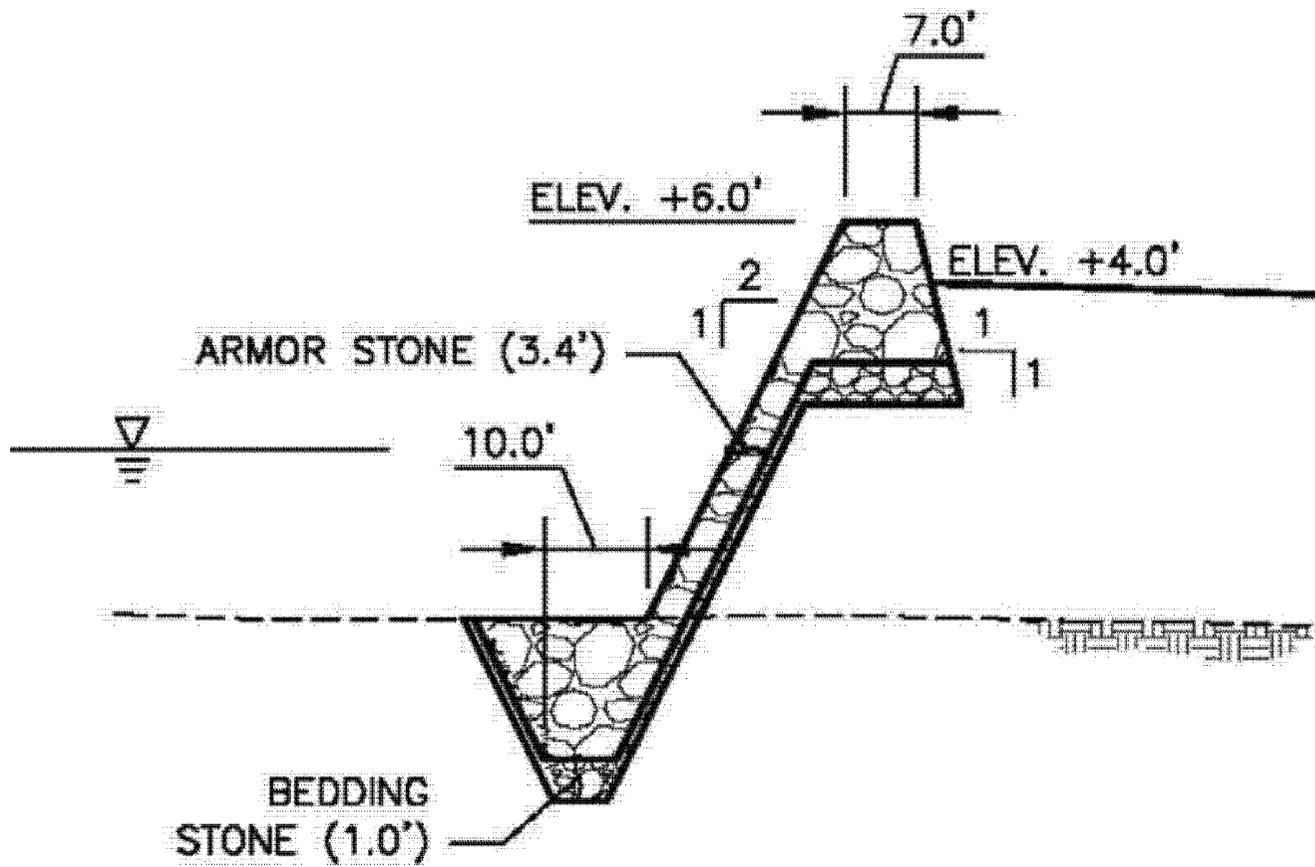


Figure 7. Typical shoreline armoring design (HDR 2014).

Attwater's greater prairie-chicken

Tympanuchus cupido attwateri

B000

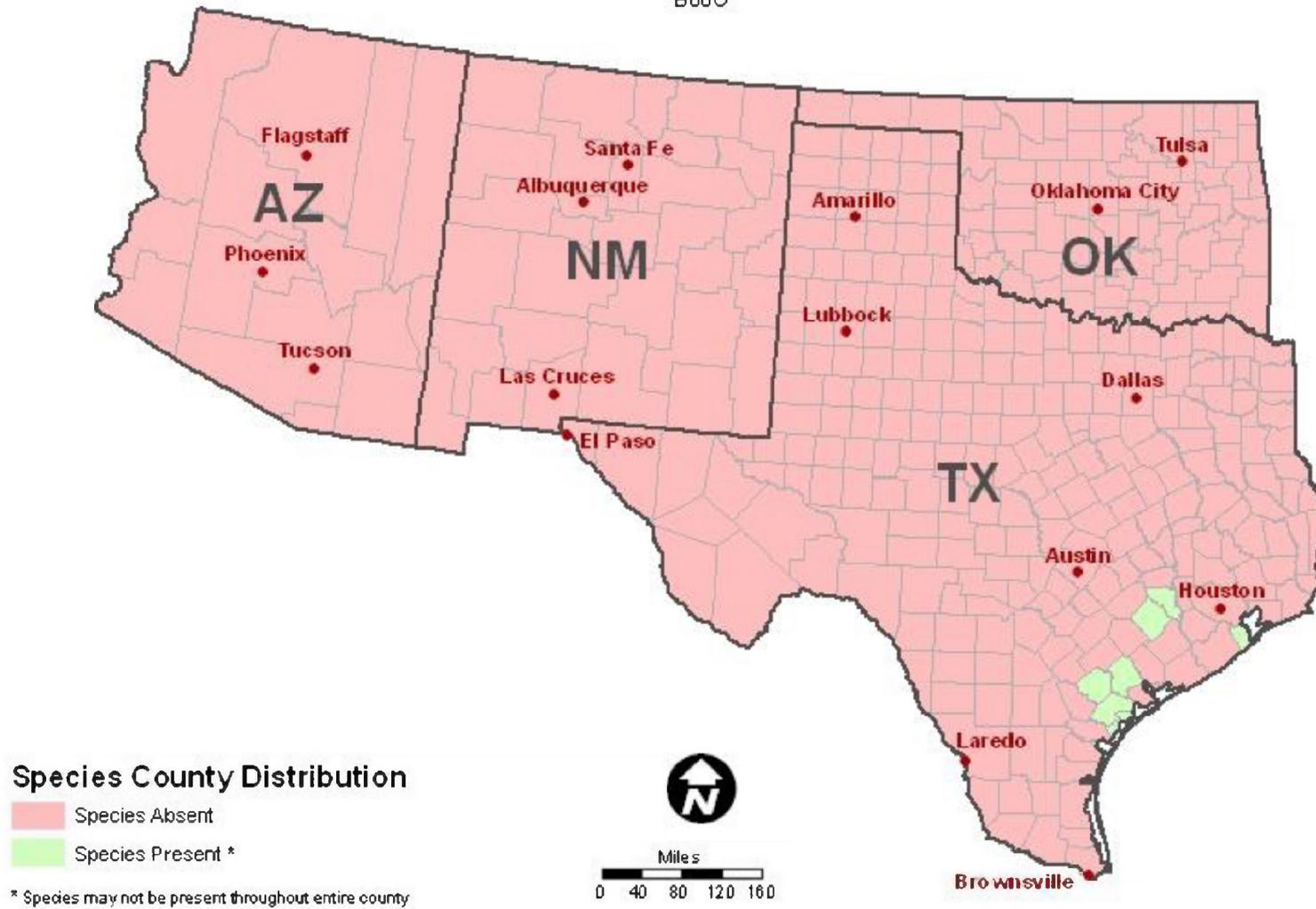


Figure 8. Location map of the county distribution of Attwater's greater prairie-chicken. Map was created by USFWS.

piping plover

Charadrius melodus

B079

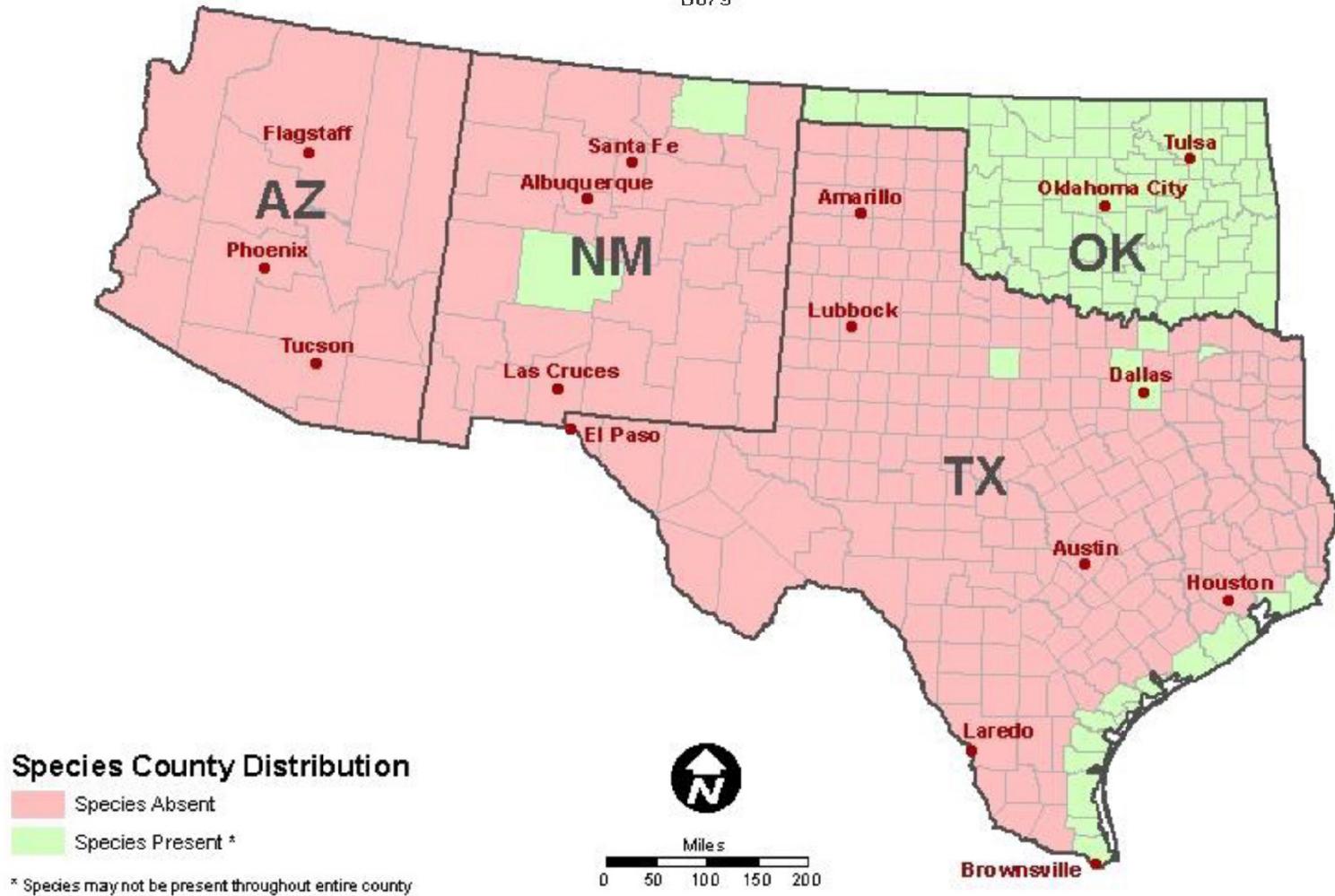


Figure 9. Location map of the county distribution of piping plover. Map was created by USFWS.

red knot

Calidris canutus rufa

BODM

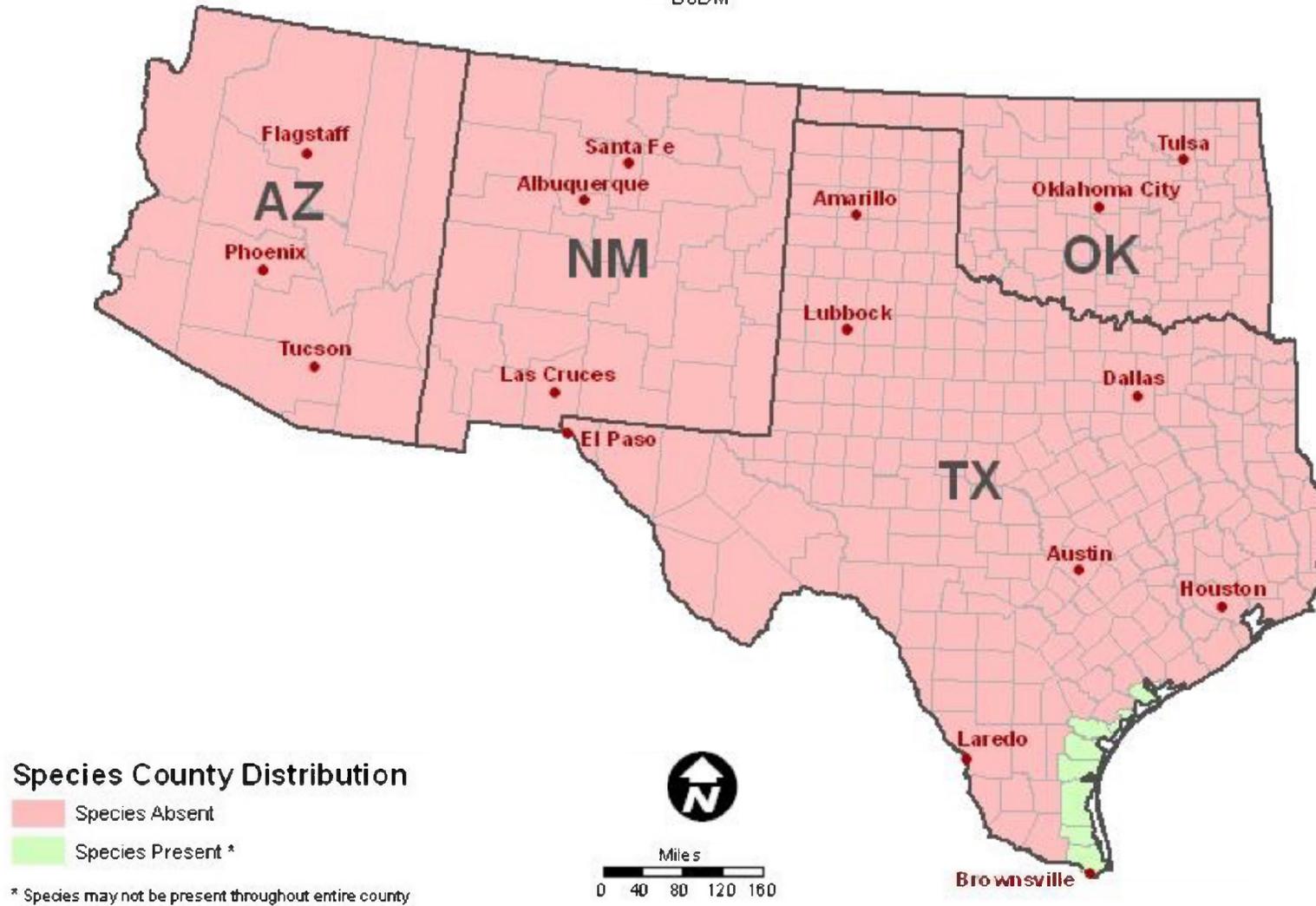


Figure 10. In contrast to the USFWS map showing red knot distribution, red knots have been found to occur in Galveston County (<http://ebird.org/ebird/map/>).

Sprague's pipit

Anthus spragueii

B0GD

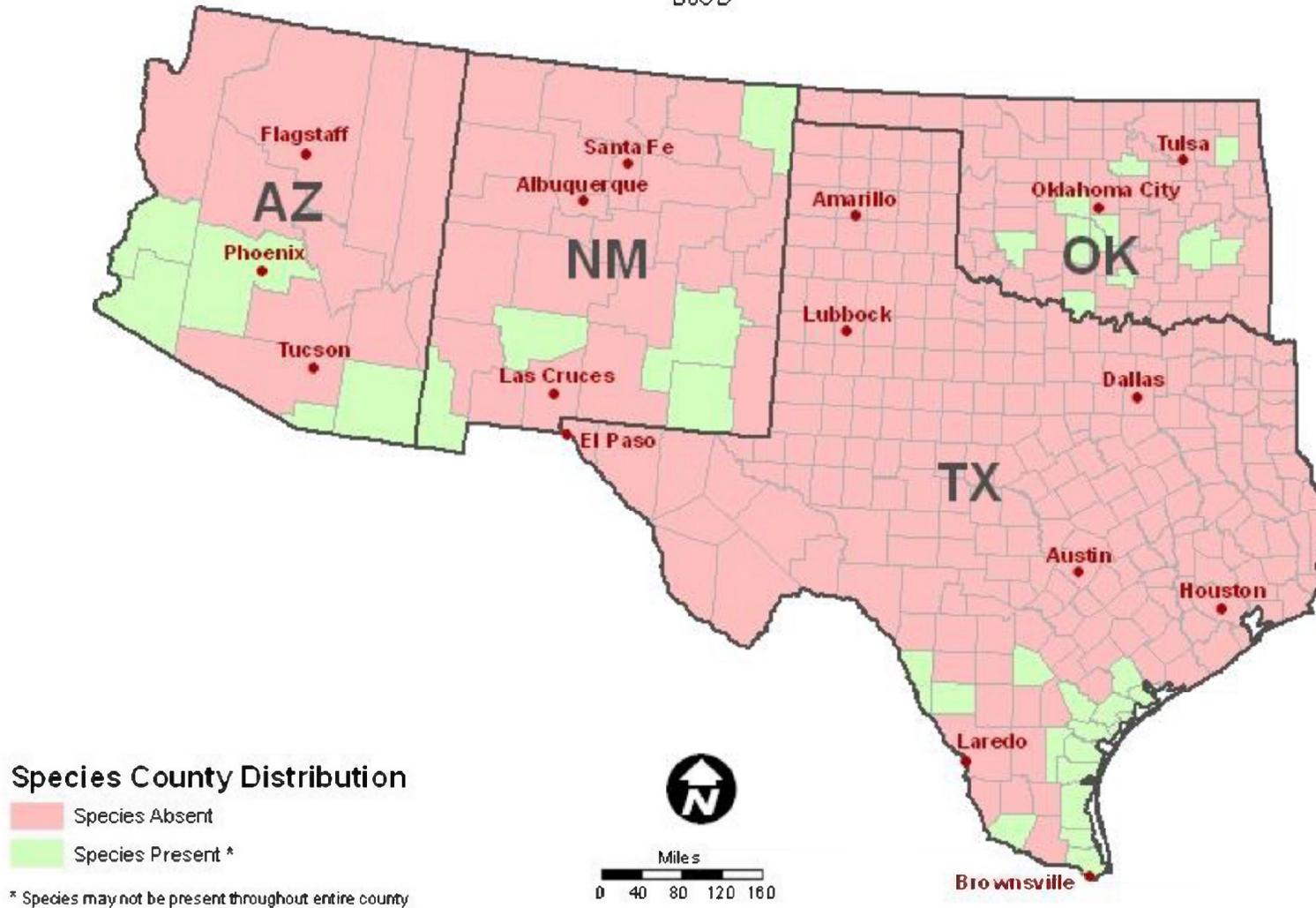


Figure 11. In contrast to the USFWS map showing Sprague's pipit distribution, Sprague's pipits have been found to occur in Galveston County (<http://ebird.org/ebird/map/>).

West Indian manatee

Trichechus manatus

A007

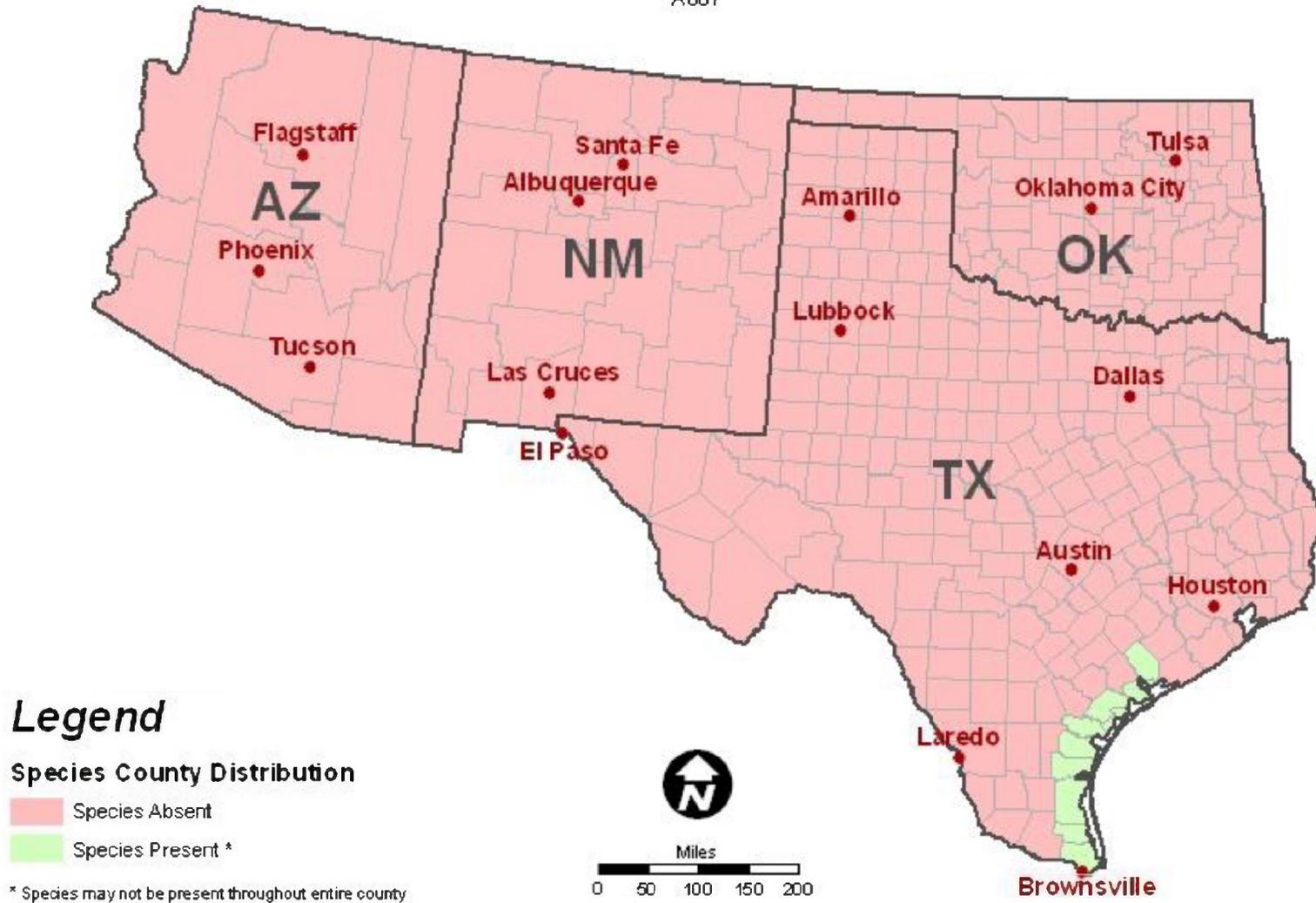


Figure 12. Despite the USFWS map showing the West Indian manatee distribution, on rare occasions they have been sighted in Galveston Bay.

green sea turtle

Chelonia mydas

C00S

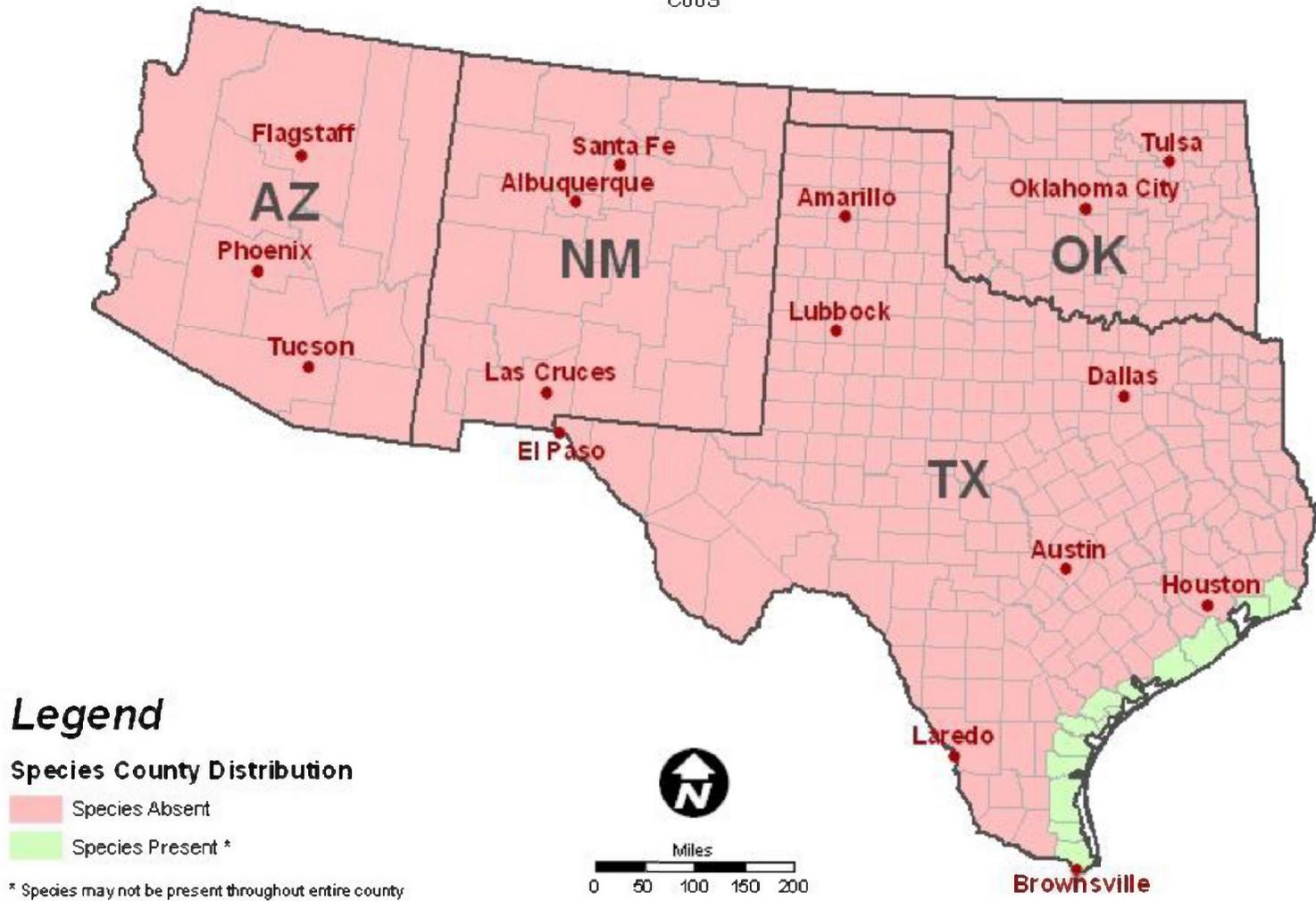


Figure 13. Location map of the county distribution of green sea turtle. Map was created by USFWS.

hawksbill sea turtle

Eretmochelys imbricata

C00E

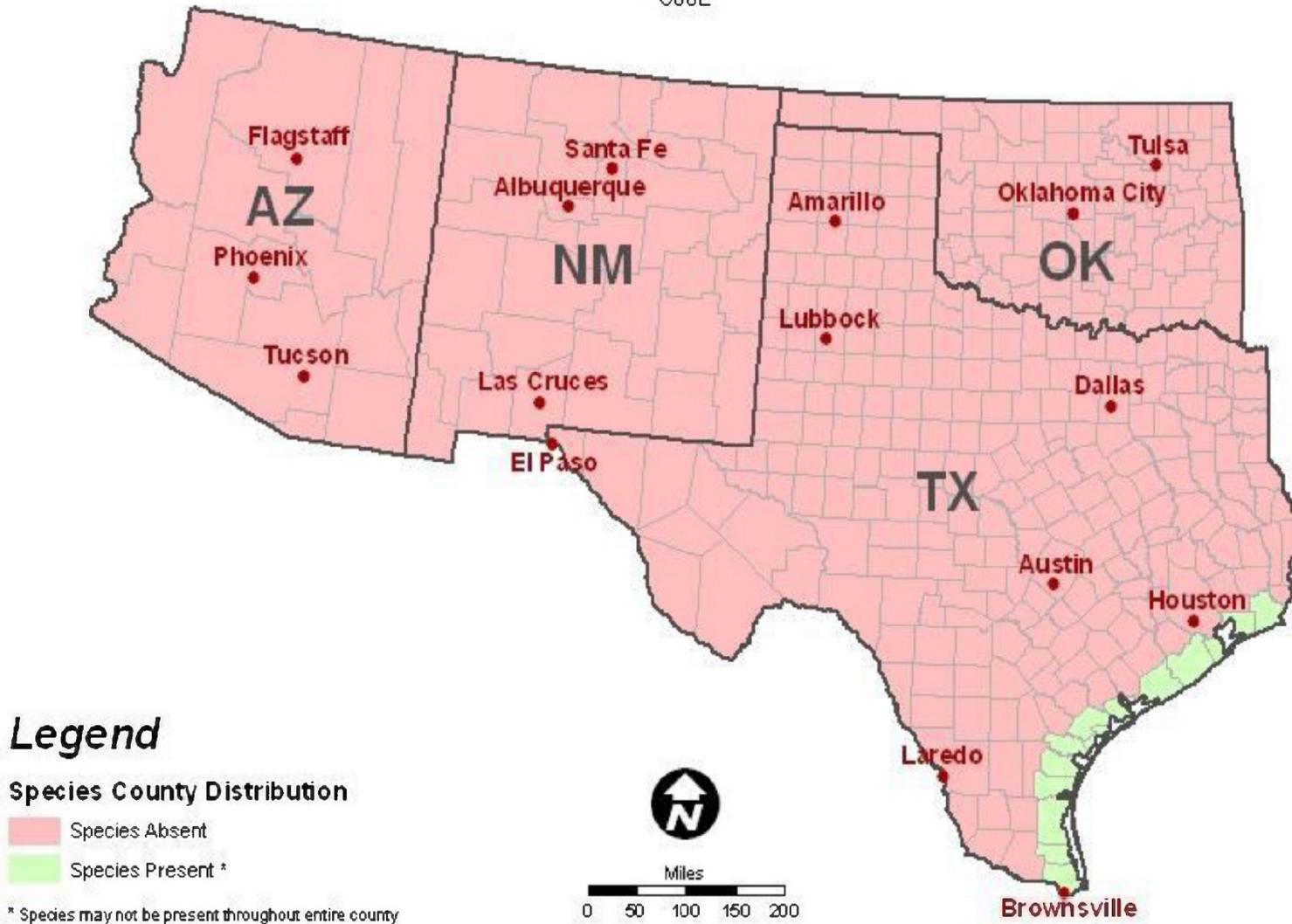


Figure 14. Location map of the county distribution of hawksbill sea turtle. Map was created by USFWS.

Kemp's Ridley sea turtle

Lepidochelys kempii

C000

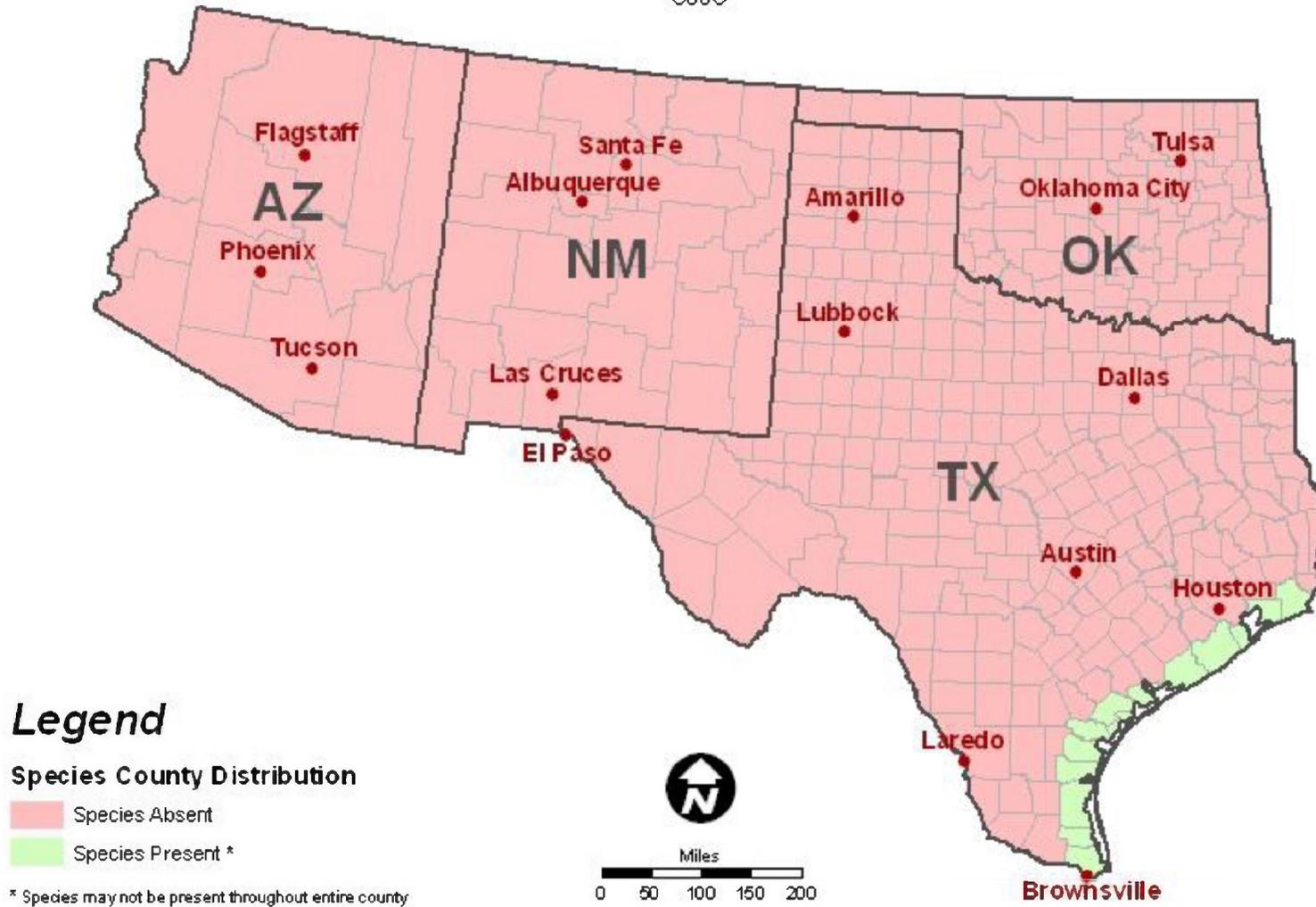


Figure 15. Location map of the county distribution of Kemp's ridley sea turtle. Map was created by USFWS.

leatherback sea turtle

Dermochelys coriacea

COOF

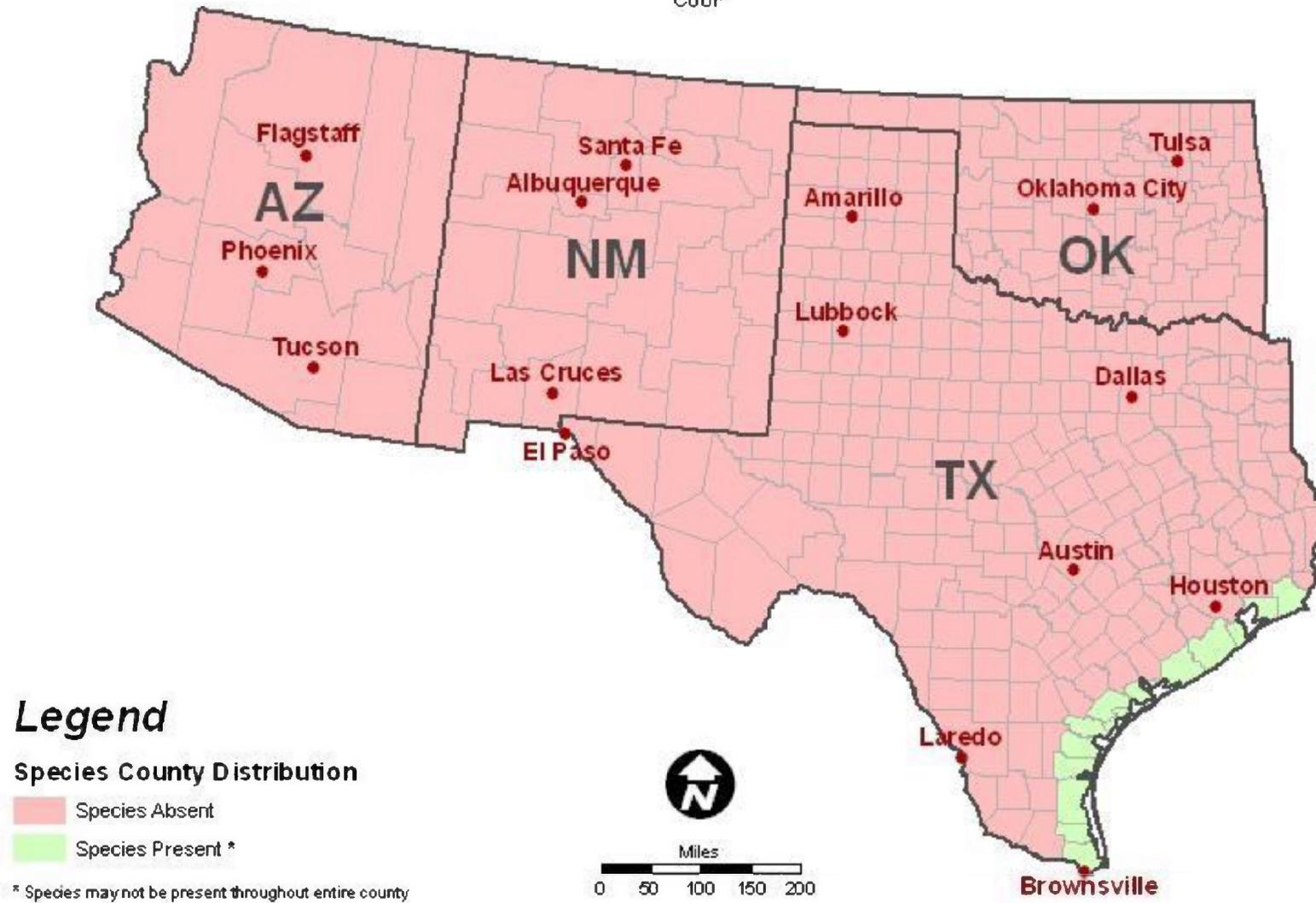


Figure 16. Location map of the county distribution of leatherback sea turtle. Map was created by USFWS.

loggerhead sea turtle

Caretta caretta

C00U

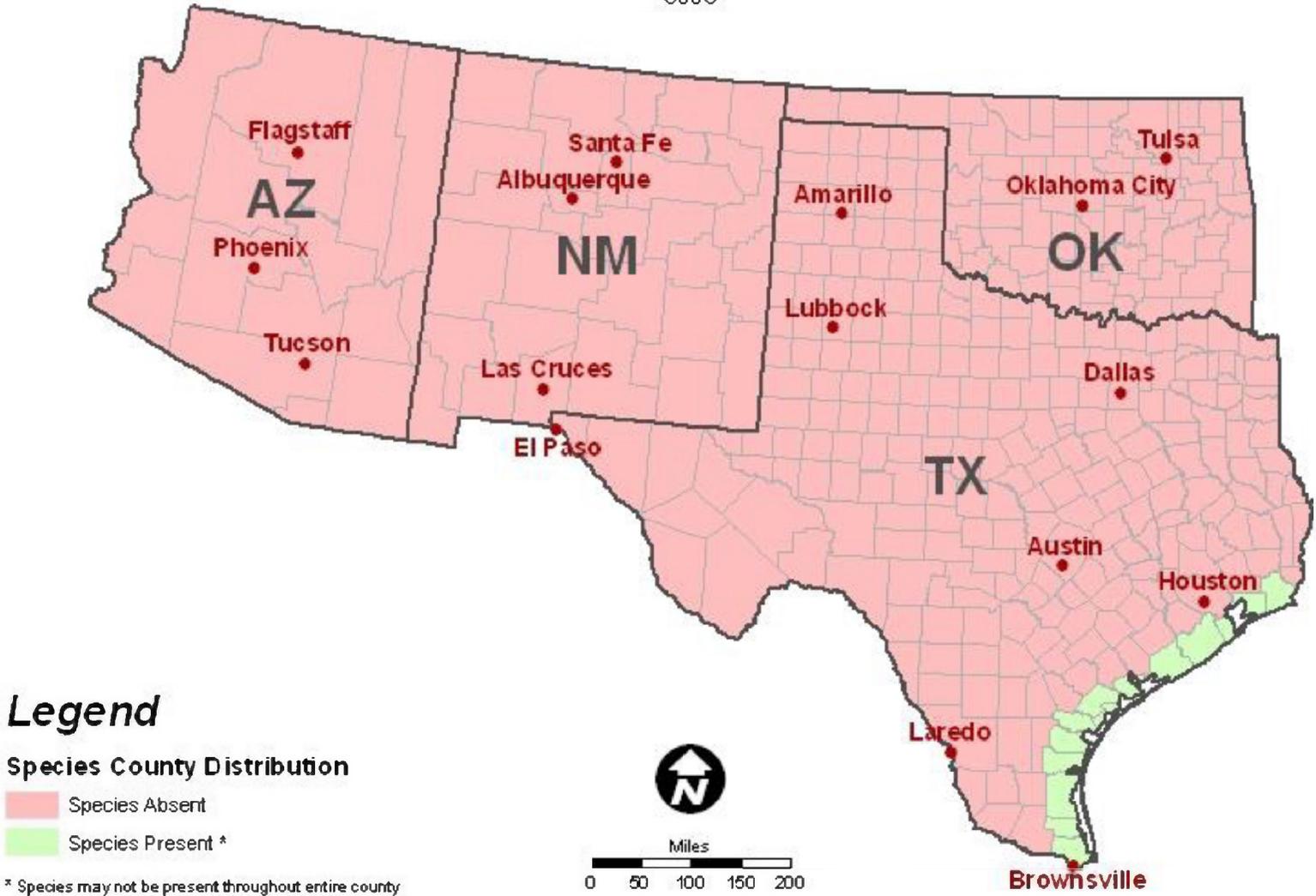


Figure 17. Location map of the county distribution of loggerhead sea turtle. Map was created by USFWS.